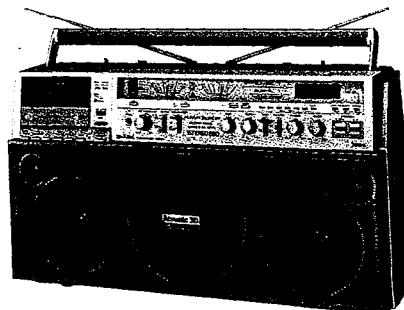


# 2-BAND STEREO RADIO CASSETTE RECORDER

MODEL NO. CS-880H, HG, U, UC

CS-880H, HG, U, UC

## AIWA® (SERVICE MANUAL)



Code No. 29-880-000-78

DATE OF ISSUE 5/1981

### SPECIFICATIONS

#### GENERAL


|                           |  |
|---------------------------|--|
| <b>Semiconductors:</b>    | 16 ICs, 1 FET, 99 transistors,<br>68 diodes, 8 LED's, 1 LCD  |
| <b>Power source:</b>      | Batteries DC 13.5V (UM-1 x 9)<br>Back-up power supply (for tuner memory)<br>DC 3V (UM-3, "AA" x 2)<br>H,HG model<br>AC 110 ~ 120V/220 ~ 240V<br>switchable 50/60 Hz<br>U,UC model<br>AC 120V/220 ~ 240V<br>switchable, 60 Hz<br>Car battery (thru car adaptor)<br>H,HG model |
| <b>Power consumption:</b> | 27W<br>U,UC model<br>39W   |
| <b>Speakers:</b>          | 140mmφ x 2 (Woofer)<br>(5-5/8")<br>50mmφ x 2 (Tweeter)<br>(2")<br>170mmφ x 1 (Passive Radiator)<br>(6-3/4")  |
| <b>Dimension:</b>         | 588(W) x 325(H) x 163(D) mm<br>[23-1/4" x 12-7/8" x 6-1/2"]  |
| <b>Weight:</b>            | 8.6 kg (18.6 lbs.)   |

#### RADIO SECTION

|                                      |   |
|--------------------------------------|---|
| <b>Frequency range:</b>              | FM 87.9 ~ 107.9 MHz<br>AM 522 ~ 1,611 kHz   |
| <b>Intermediate frequency:</b>       | FM 10.7 MHz<br>AM 450 kHz   |
| <b>Sensitivity:</b><br>(IHF, THD 3%) | FM (H,HG model)<br>13 ± 6 dB (at 87.9 MHz)<br>12 ± 6 dB (at 98.0 MHz)<br>13 ± 6 dB (at 107.9 MHz)<br>(U,UC model)<br>14 ± 6 dB (at 87.9 MHz)<br>13 ± 6 dB (at 98.0 MHz)<br>14 ± 6 dB (at 107.9 MHz)<br>47 ± 5 dB (at 594 kHz)<br>45 ± 5 dB (at 1,008 kHz)<br>42 ± 5 dB (at 1,404 kHz) |
| <b>(S/N 10 dB)</b>                   |   |
| <b>Image rejection:</b>              | FM 45 ± 5 dB (at 107.9 MHz)<br>AM 41 ± 5 dB (at 1,404 kHz)  |
| <b>IF rejection:</b>                 | FM 80 ± 10 dB (at 87.9 MHz)<br>AM 31 ± 5 dB (at 594 kHz)  |
| <b>Total harmonic distortion:</b>    | FM Less than 1.5% (at 98 MHz)<br>AM 1.7 ± 1.0% (at 1,008 kHz)   |
| <b>FM stereo separation:</b>         | 22 ± 3 dB (at 1 kHz)  |
| <b>Auto stop level:</b>              | FM 22 ± 10 dB (at 98 MHz)<br>AM 60 ± 10 dB (at 1,008 kHz)   |

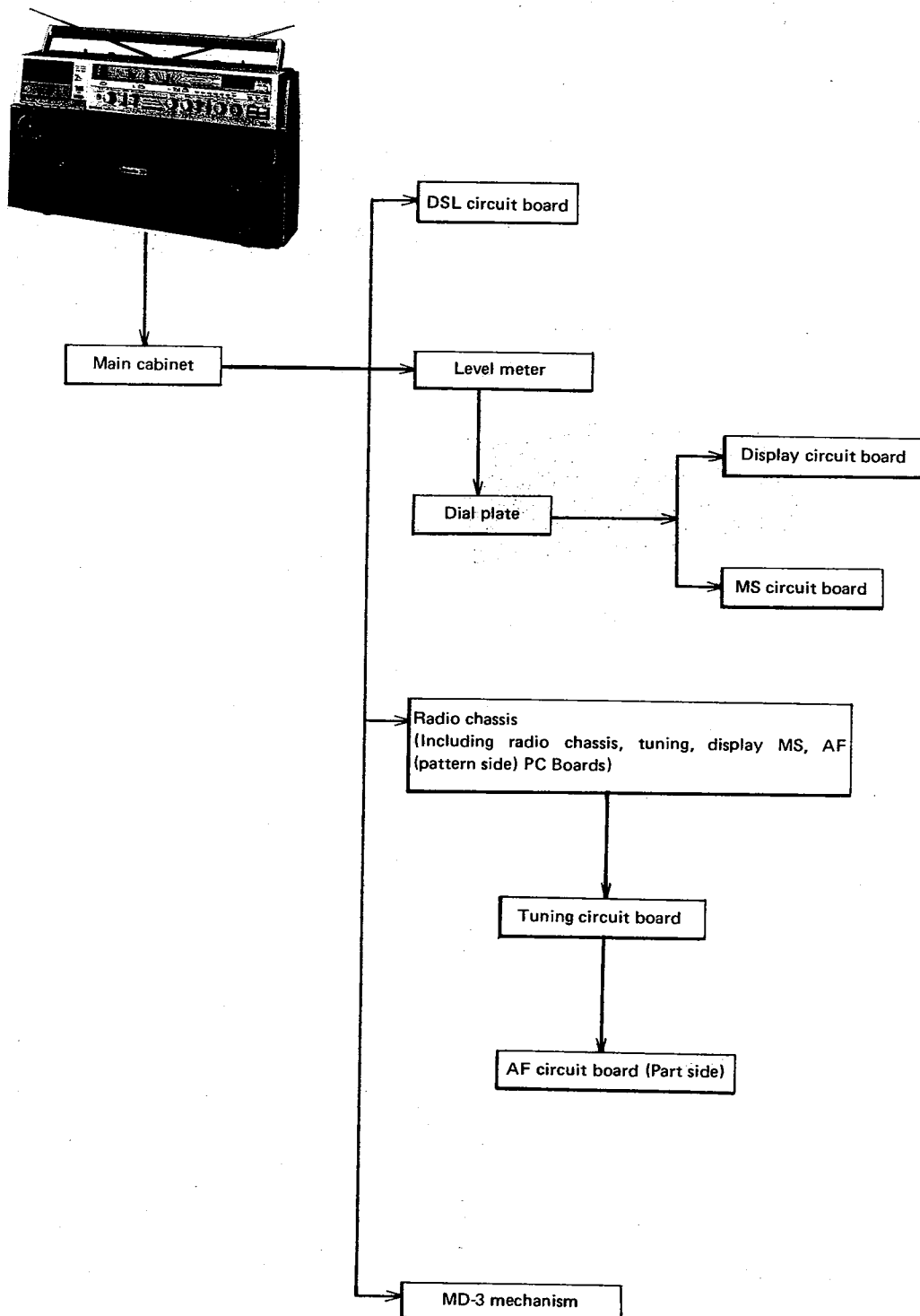
#### TAPE RECORDER SECTION

|  |  |
|--|--|
| <b>Tape speed:</b>                             | 4.8 cm/s. ± 3%   |
| <b>Recording system:</b>                       | AC bias  |
| <b>Erasing system:</b>                         | AC erase   |
| <b>Record bias frequency:</b>                  | 61 ± 0.5 kHz   |
| <b>Distortion:</b>                             | Less than 1.5% (PB)<br>Less than 1.5% (REC/PB)   |
| <b>Frequency response:</b>                     | METAL tape 35 ~ 16,000 Hz<br>CrO <sub>2</sub> tape 35 ~ 13,000 Hz<br>LH tape 35 ~ 12,500 Hz  |
| <b>Signal to noise ratio:</b><br>(Un-weighted) | More than 49/46 dB<br>[DC/AC] (PB)<br>More than 44/42 dB<br>[DC/AC] (REC/PB)   |
| <b>Erasing ratio:</b>                          | More than 60 dB  |
| <b>Separation:</b>                             | More than 39 dB (REC/PB)   |
| <b>Output power:</b>                           | H,HG model<br>More than 24W [12W + 12W]<br>U,UC model<br>7 watts per channel,<br>Min. RMS at 8 ohms,<br>from 200 Hz to 10 kHz, with<br>no more than 10%<br>Total Harmonic Distortion |
| <b>FF &amp; rewind time:</b>                   | 90 ± 5 s. (at C-60)  |
| <b>Automatic stop system:</b>                  | Mechanical auto stop   |
| <b>Pinch roller pressure:</b>                  | 125 ± 15 g   |
| <b>Wow and flutter:</b>                        | Less than 0.038% (WRMS)  |
| <b>Take-up torque:</b>                         | 35 <sup>+15</sup><br>-5 g-cm   |
| <b>FF &amp; rewind torque:</b>                 | 110 ± 20 g   |
| <b>Input terminal:</b>                         | MIC 3.5φ jack x 2<br>PHONO/LINE IN pin jack x 2  |
| <b>Input sensitivity/impedance:</b>            | MIC 0.3mV/3kΩ<br>LINE IN 150mV/47kΩ<br>PHONO 4mV/47kΩ<br>LINE OUT pin jack x 2<br>EXT. SP 3.5φ jack x 2<br>PHONES 6.3φ jack  |
| <b>Output terminal:</b>                        |  |

- Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the  symbol are trademarks of Dolby Laboratories Licensing Corporation.
- Specifications and external appearance are subject to change without notice due to product improvement.

## DISASSEMBLING CHART OF MAIN PARTS

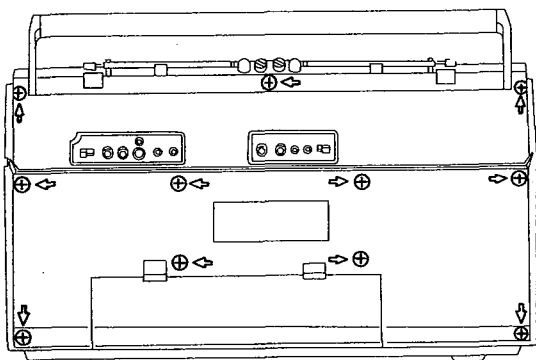
- To avoid troubles when disassembling or replacing the main parts, follow the chart diagram as below.



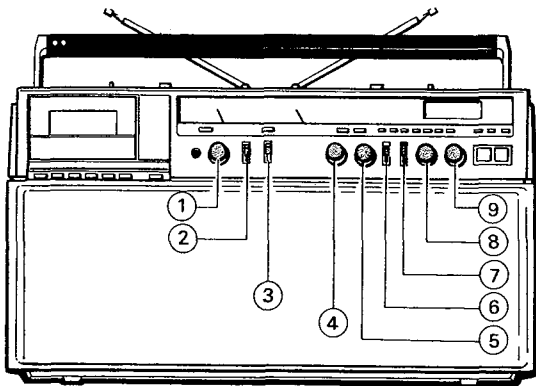
## DISASSEMBLY INSTRUCTIONS

### Removing the Main Case

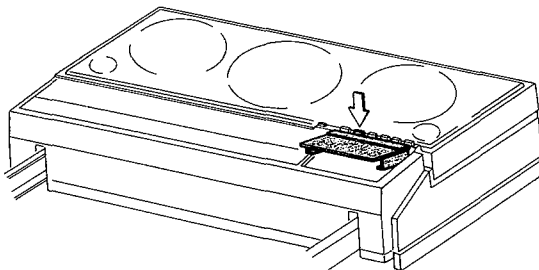
- 1) Remove 11 screws on the rear lid shown by arrows ←.



- 2) Remove 9 knobs.



- Note 3)** Open the cassette lid.  
(It is not required to remove the cassette lid)

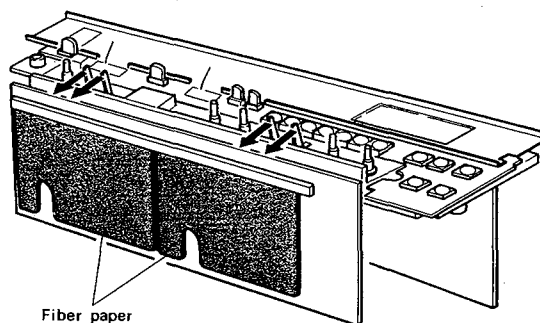


### Installing the Main Case

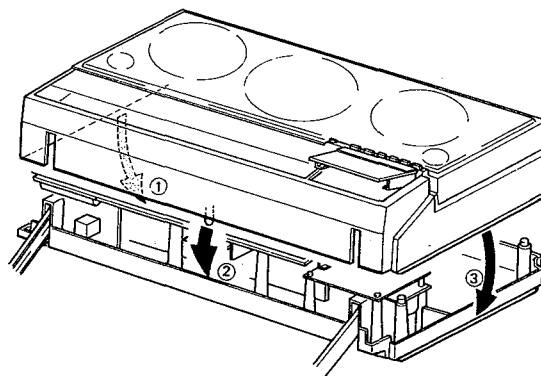
- 1) Check that the fibre paper of the REC/PB PC Board (pattern die) is fixed properly.

**Note:** Firmly fix the fibre paper using two-sided tape, etc. because it is likely to lift up when it is peeled off once.

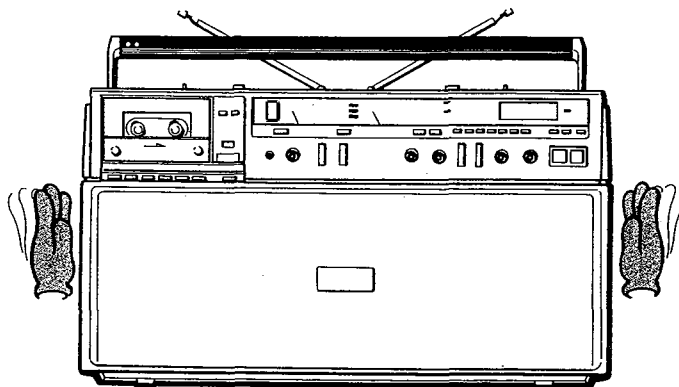
- 2) Lower all the lever switches in the direction of the arrow.



- Note 3)** Be sure to install in the order (1) – (3). Be careful: when it is mounted incorrectly, it may damage the dial plate and the display PC Boards, etc.

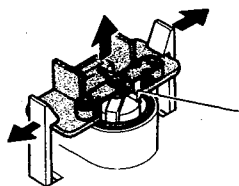


- 4) Match the knobs while performing item 3) and tapping the side.

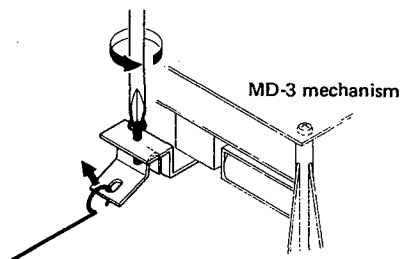


**Note:** Removing the radio chassis

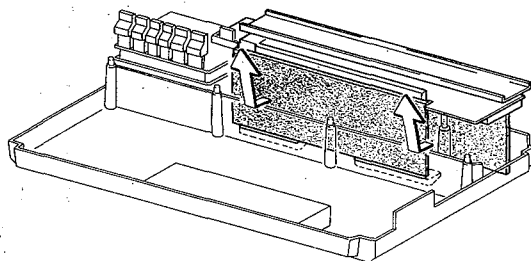
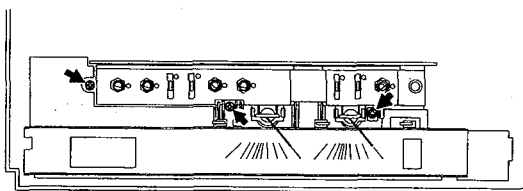
- 1) Be sure to remove the level meter before starting work to prevent the pointer of the level meter from being damaged.



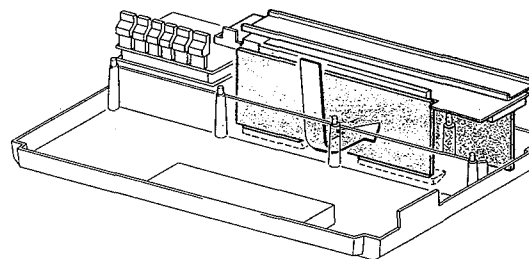
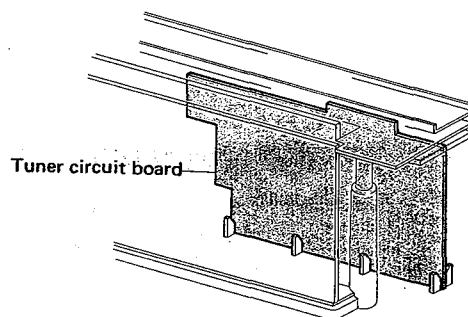
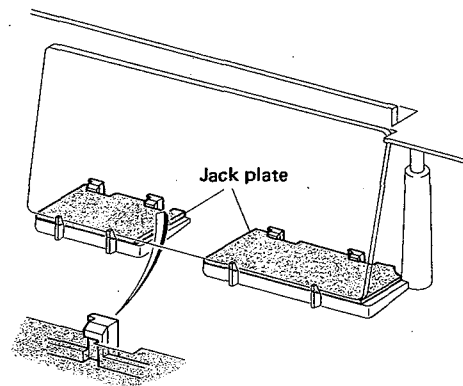
- 2) Loosen the screw and lift up the hook.



- 3) Remove 3 screws and lift up the radio chassis in the direction of the arrow. The radio chassis, REC/PB, tuner, MS and display PC Boards are removed at that time.

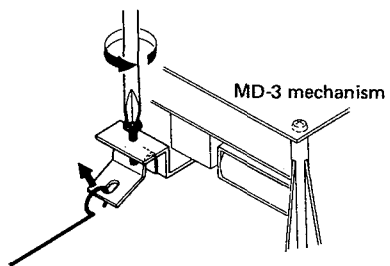
**Note:** Installing the radio chassis

- 1) Hook the jack plate to the tab of the rear lid while paying attention not to pinch the wire. Compress the radio chassis against the direction of the arrow after checking that the tuner PC Board is inserted into the rib.

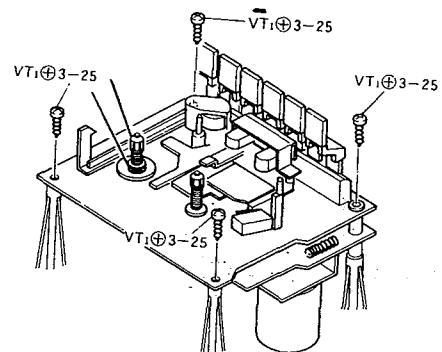


**Removing Mechanism**

- 1) Loosen the screw and remove the hook of the rod.

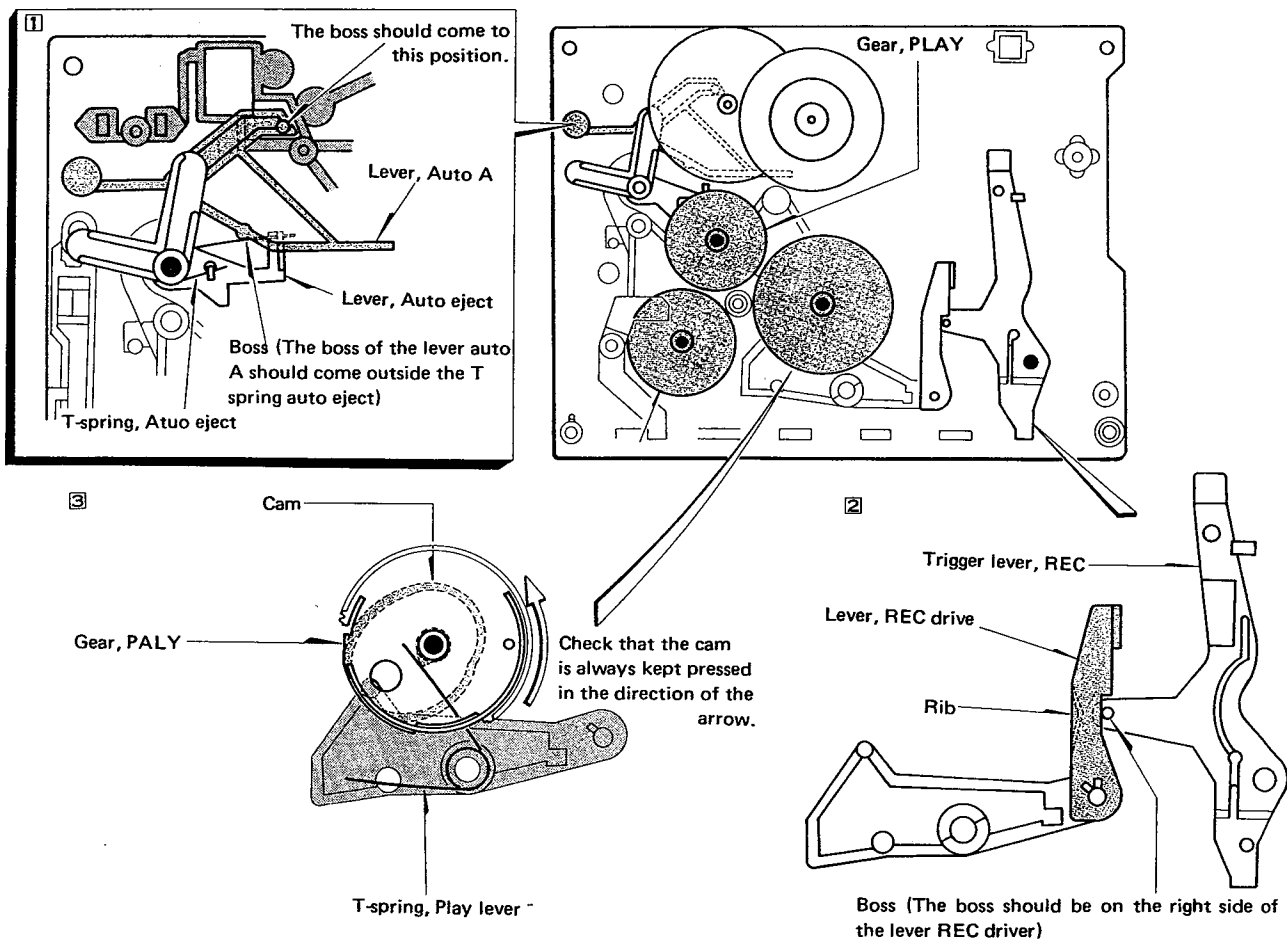


- 2) Remove 4 screws.

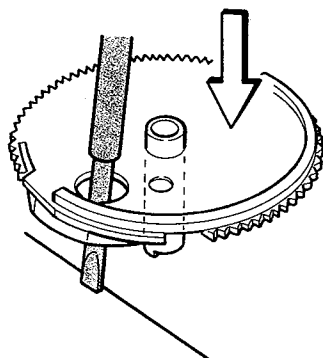


### Cautions on Disassembling MD-3 Mechanism

Disassemble or repair the MD-3 mechanism while paying attention to the springs and levers, etc. shown in the figure below.



Be sure to hook the T-spring (PLAY lever) to the cam of the gear when installing the gear PLAY.  
Hook it from the inside of the gear using a clock screwdriver as shown in the figure. Perform the same for the gear FR and cam gear PAUSE.



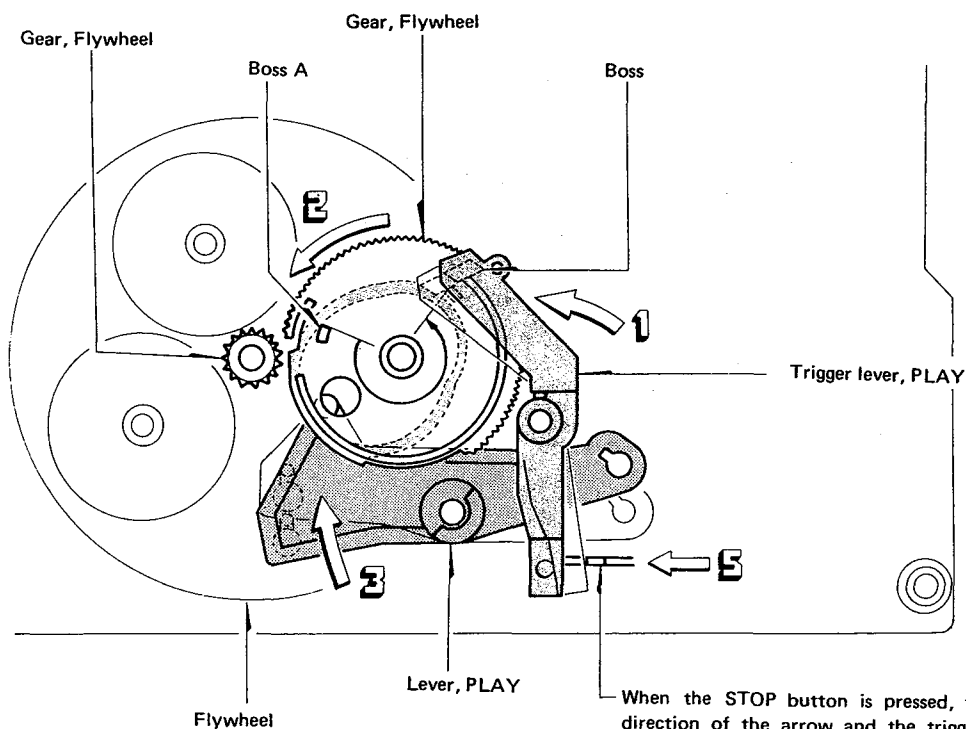
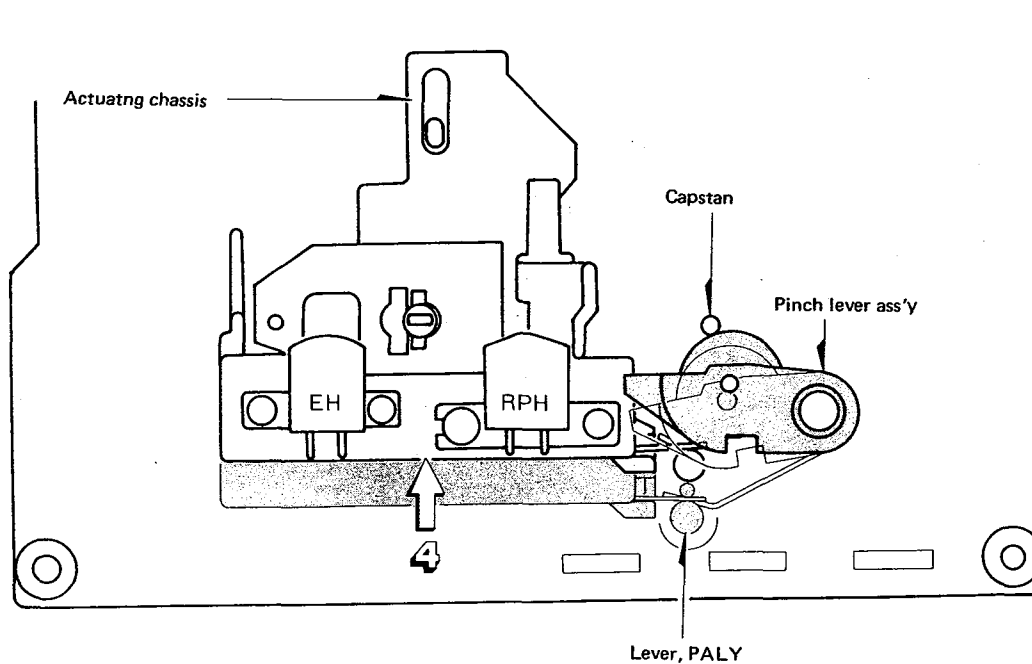
## DESCRIPTION OF THE MD-3 MECHANISM

### Description of the PLAY Operation

With the plate button pressed, the trigger lever (PLAY) moves in the direction of the arrow ← (1), the gear (PLAY) is released from the boss of the trigger lever (PLAY) engages with the gear flywheel and rotates in the direction of the arrow ← (2), the boss (A) of the gear (PLAY) touches the trigger lever (PLAY) and the gear stops rotating.

When the gear (PLAY) rotates, the lever (PLAY) moves in the direction of the arrow ← (3) along the cam groove on the rear of the gear to push up the operation chassis in the direction of the arrow ← (4).

The PLAY button which has been locked is released by pressing the STOP button, the trigger lever (PLAY) moves in the direction of the arrow ← (5), the boss (A) of the gear (PLAY) is released and the PLAY operation stops.

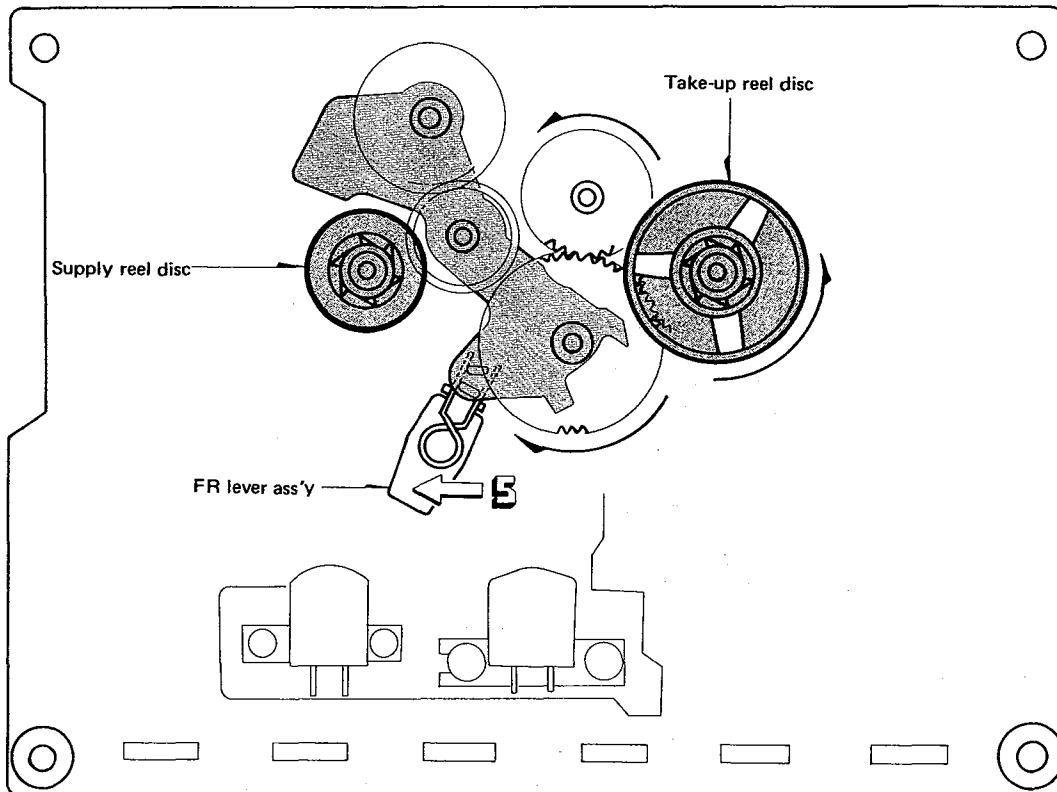
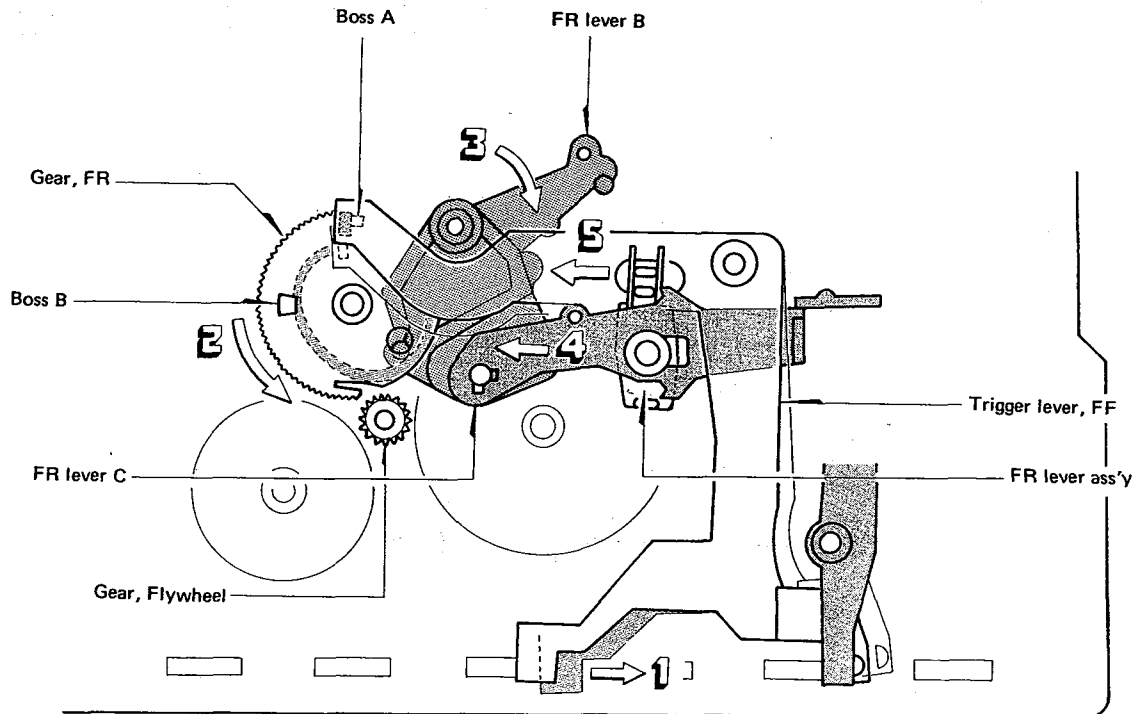


When the STOP button is pressed, the lever moves in the direction of the arrow and the trigger lever PLAY releases the boss (A) of the gear (PLAY).

### Description of the FF Operation

When the FF button is pressed, the trigger lever FF moves in the direction of the arrow ← (1), the boss of the gear FR cam is released and engages with the gear wheel to rotate in the direction of the arrow ← (2), the boss (A) touches the boss of the trigger lever FF

and the gear FR cam stops. The FR lever B moves in the direction of the arrow ← (3) along the groove of the gear FR cam, the FR lever B moves in the direction of the arrow ← (3), the FR lever C compresses the gear of the FR lever Ass'y against the Take-up reel disc ass'y to perform the FF operation.

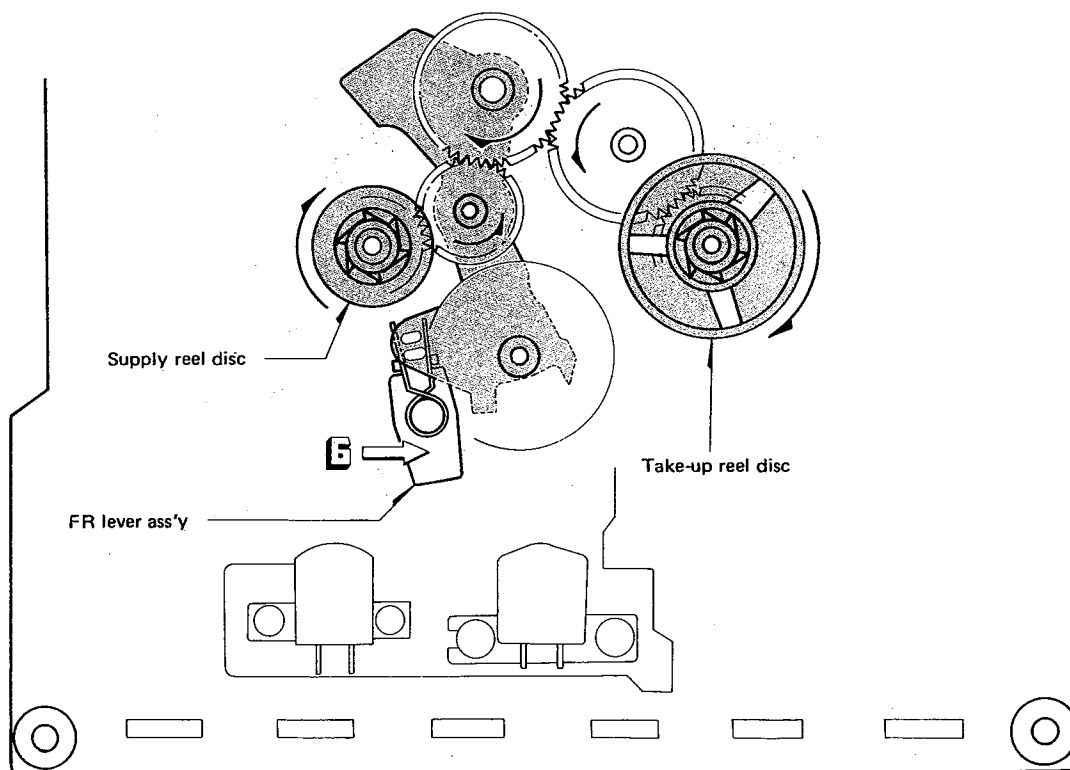
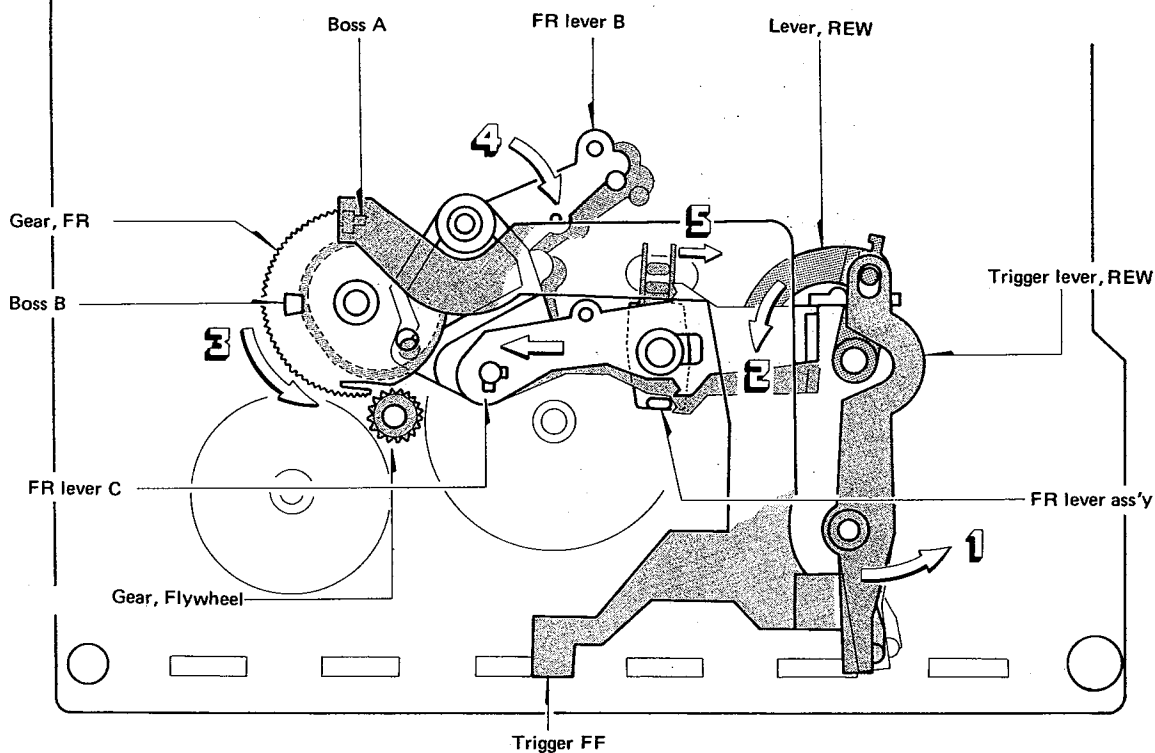




### REW Operation

When the REW button is pressed, the trigger lever REW moves in the direction of the arrow ← (1) and pushes the lever REW in the direction of the arrow ← (2). The trigger lever FF releases the boss A of the gear at that time, the gear FR engages with the gear flywheel, rotates in the direction of the arrow ← (3), boss B touches the trigger lever FF and rotation stops.

The FR gear B is moved in the direction the arrow ← (4) by means of the cam of the gear FR following the rotation of the gear FR; pulls the FR lever C in the direction of the arrow ← (5) and moves the FR lever ass'y in the direction of the arrow ← (6) to rotate the Take-up reel disc reel disc ass'y to perform the REW operation.

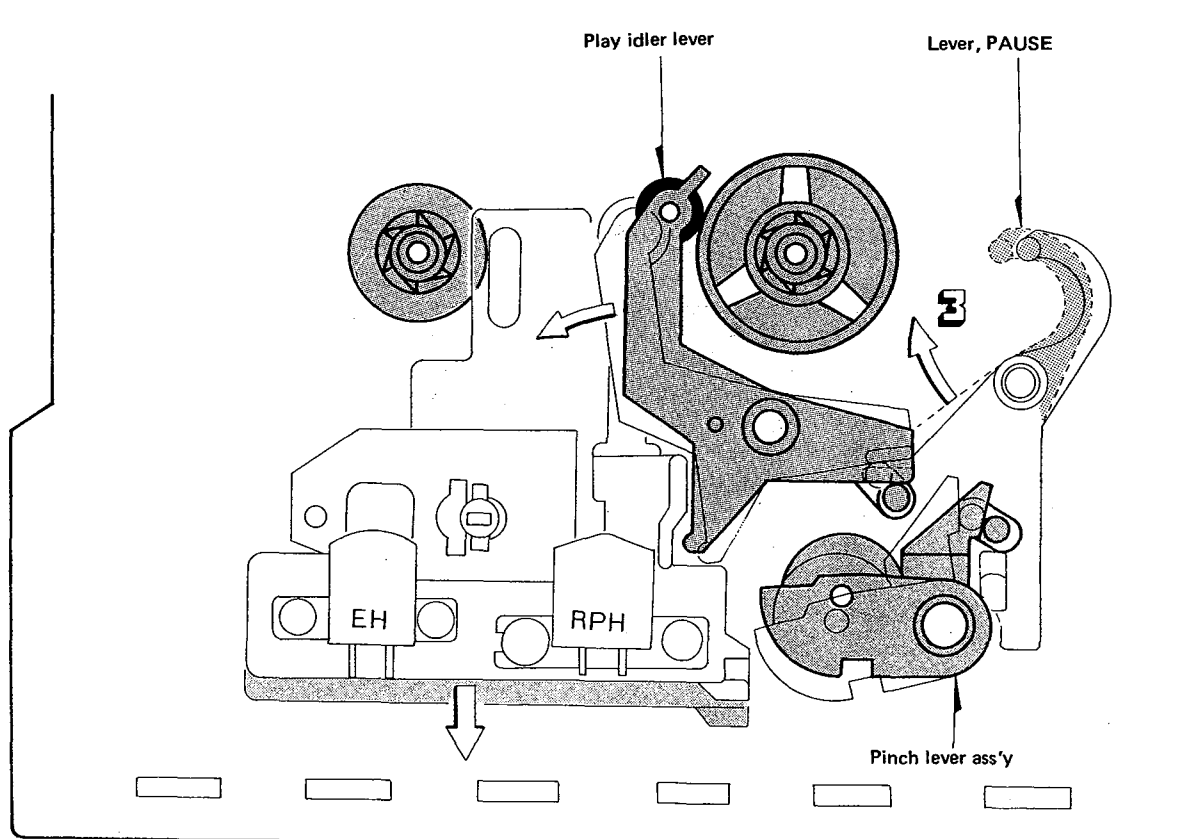
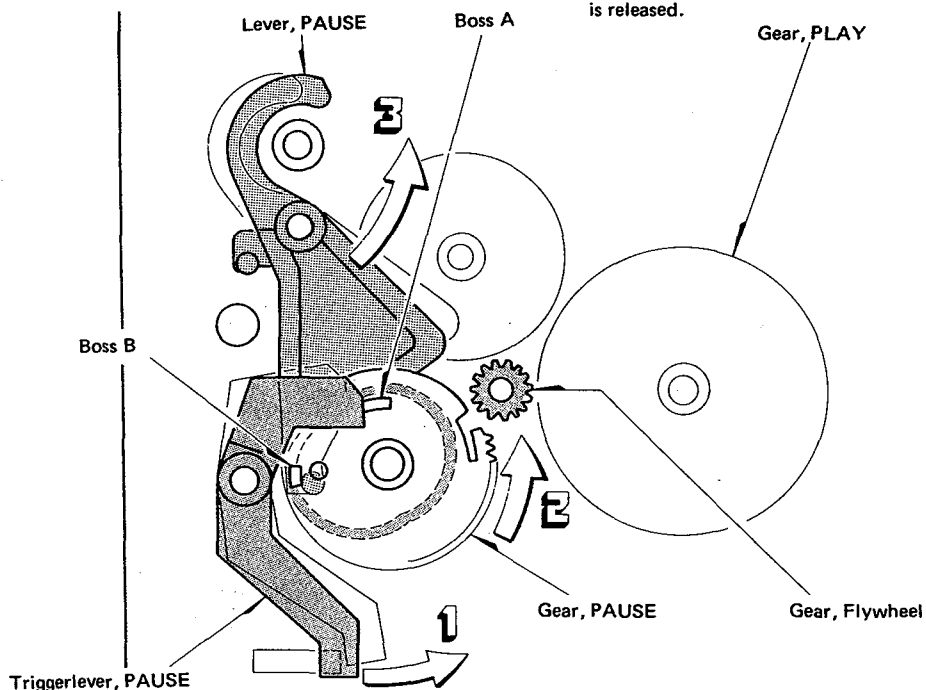


### Description of the PAUSE Operation

When the PAUSE button is pressed, the trigger lever PAUSE moves in the direction of the arrow ← (1), the boss A of the gear PAUSE is released, engages with the gear flywheel and rotates in the direction of the arrow ← (2), the boss B touches the trigger PAUSE and rotation stops.

The PAUSE lever moves in the direction of the arrow ← (3) along the cam groove of the PAUSE gear at that time. The PLAY idler lever and the pinch lever ass'y is moved to perform the PAUSE operation at that time.

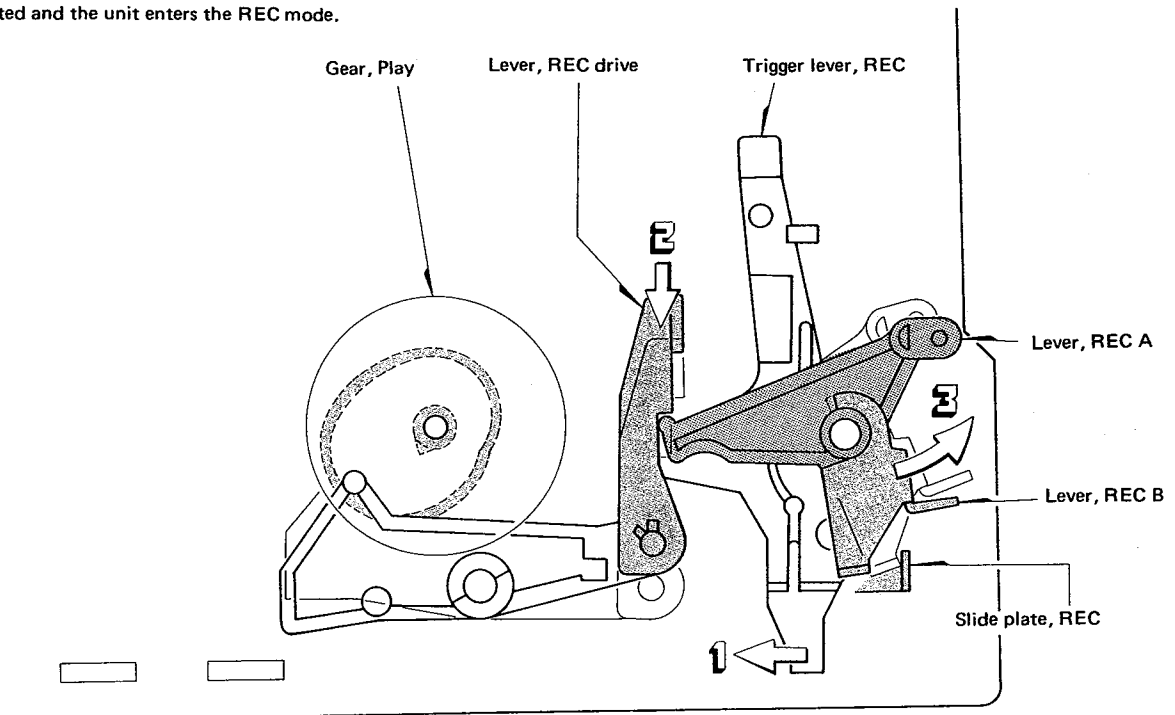
When the PAUSE button is pressed again, the button is released from locking and simultaneously the boss B of the gear PAUSE is released from the trigger lever PAUSE and the PAUSE operation is released.



### REC Operation

When the REC and PLAY buttons are pressed simultaneously, the trigger lever REC moves in the direction of the arrow ← (1). The PLAY operation is performed simultaneously at that time, so the REC lever driver moves in the direction of the arrow ← (2), pushes the lever REC A, B in the direction of the arrow ← (3), the interlocked slide REC plate pulls the rod, the slide switch is operated and the unit enters the REC mode.

When one of the STOP, FF and REW buttons is pressed, the REC trigger lever is released from the REC lever driver and only the REC operation is released.



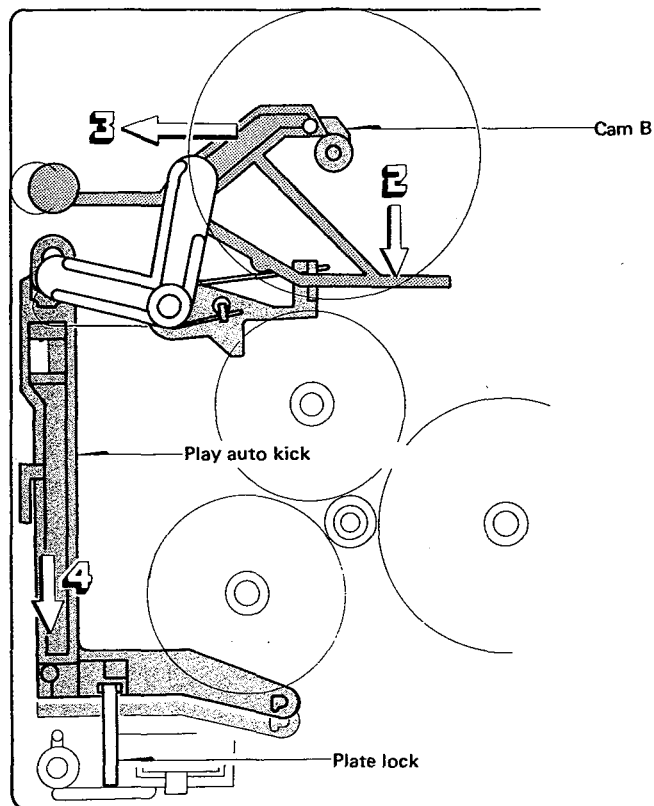
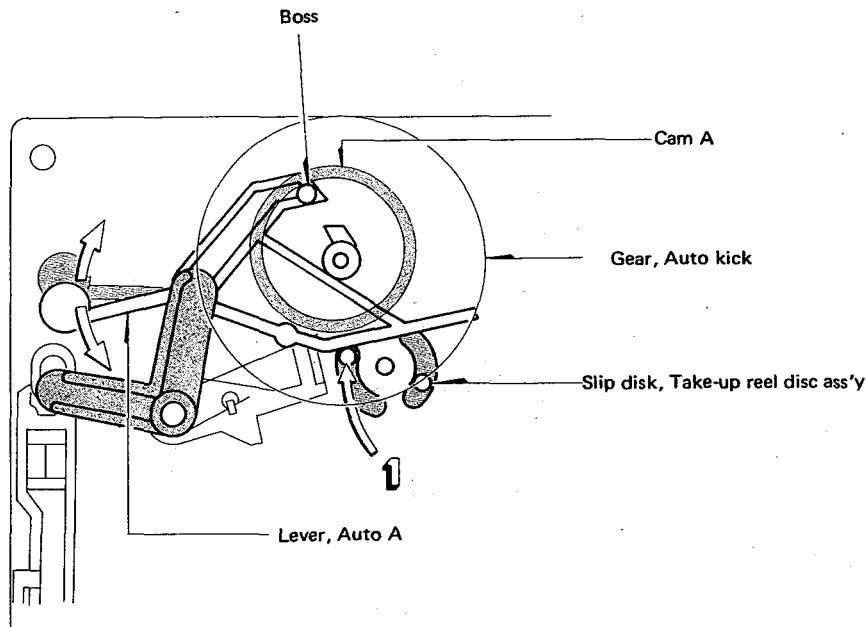
### Description of the Auto-stop Operation

The motor rotation is transmitted to the gear auto-kick of the MD-3 mechanism via the slip pulley FR ass'y.

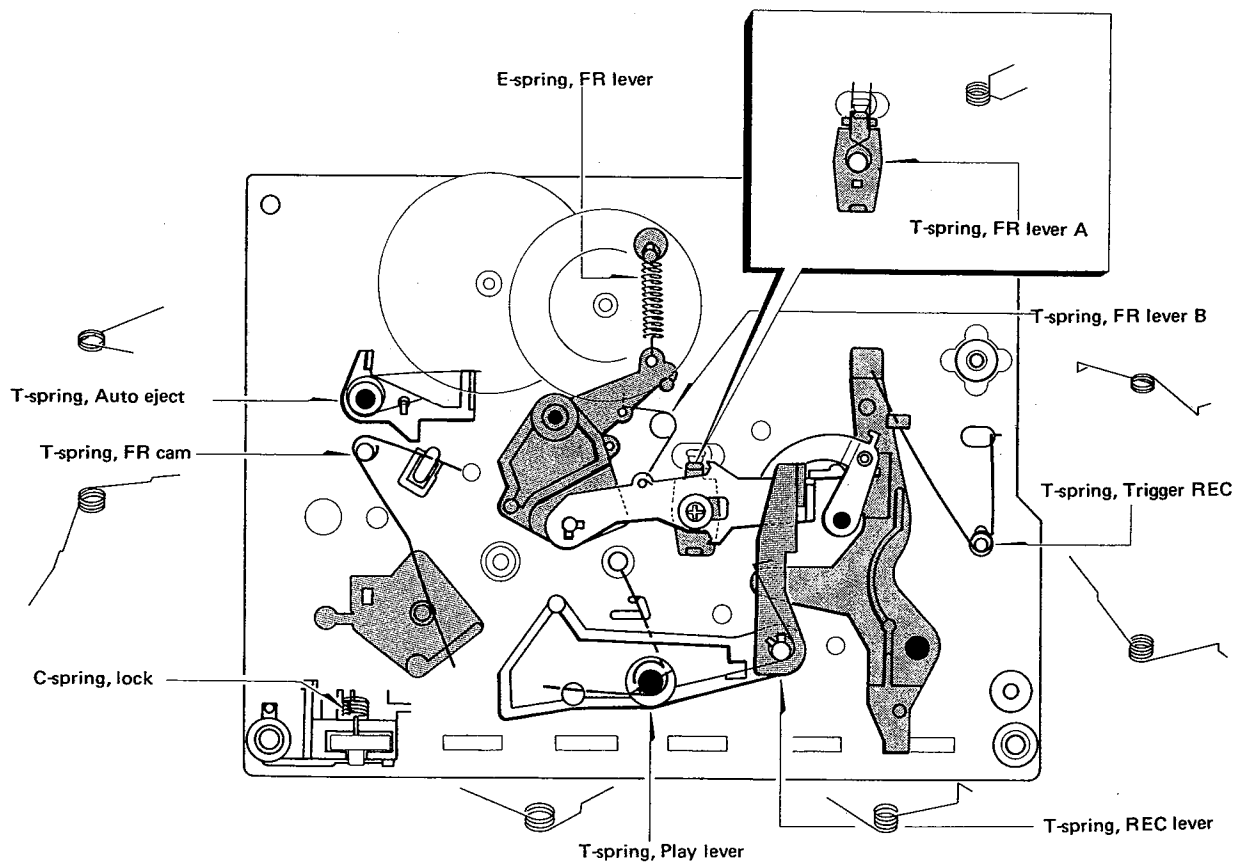
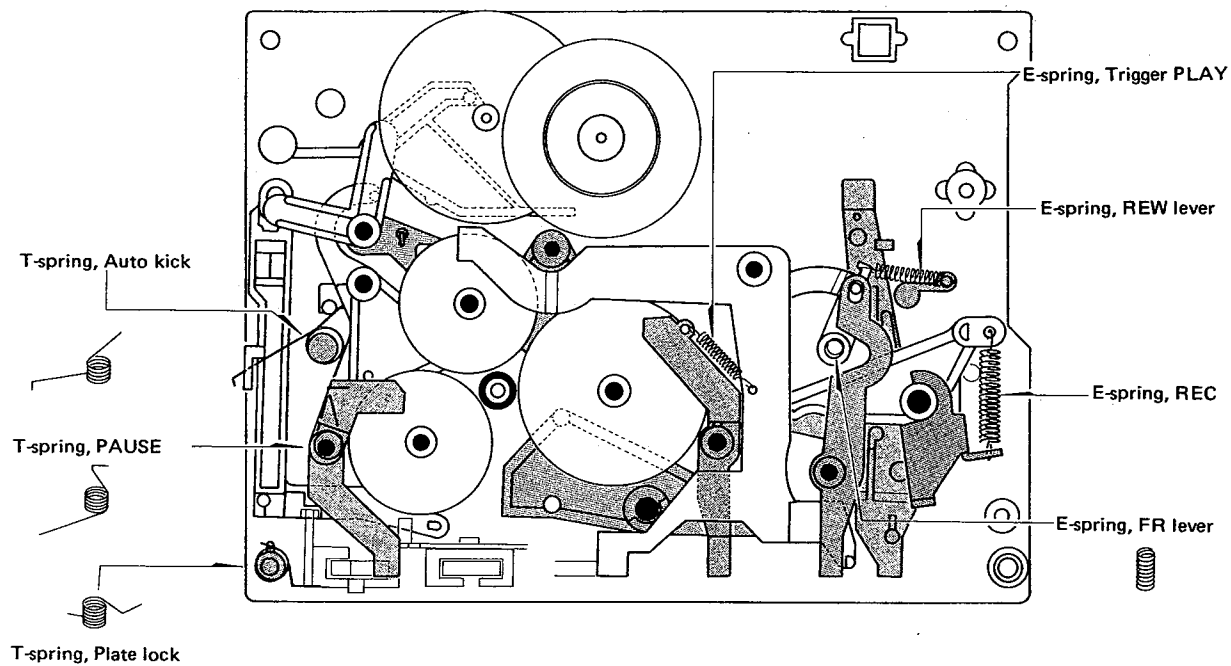
The slip disk presses the lever auto A in the direction of the arrow ← (1) when the Take-up reel disc ass'y is rotating, so the boss of the lever auto A moves along the cam (A) groove of the gear auto-kick.

When the reel discs (S, T sides) stop, the lever auto A stops in the condition being moves in the direction of the arrow ← (2).

The cam (B) of the gear auto-kick moves the lever auto A in the direction of the arrow ← (3), operates the plate auto-kick in the direction of the arrow ← (4) to release the plate lock and performs the AUTO STOP operation.



## SPRING APPLICATION POSITION





## PARTS LIST

## MECHANICAL PARTS

\* mark in this part list shows exclusive part.

| Ref. No. | Part No.      | Part No.<br>Changed to | Description                                      | Common<br>Model | Q'ty |
|----------|---------------|------------------------|--|-----------------|------|
| 1-1a     | 09-017-839-01 |                        | Main case ass'y (Silver)<br>(H,U,UC model only)  | *               | 1    |
| 1-1b     | 09-017-840-01 |                        | Main case ass'y (Blue)                           | *               | 1    |
|          | 82-587-001-01 |                        | Cabinet, Main (Silver)                           | *               | 1    |
|          | 82-587-044-01 |                        | Cabinet, Main (Blue)                             | *               | 1    |
|          | 82-587-234-01 |                        | Damper A, Rubber                                 | *               | 14   |
|          | 82-587-235-01 |                        | Damper B, Rubber                                 | *               | 4    |
|          | 82-587-007-01 |                        | Punching (Silver)                                | *               | 1    |
|          | 82-587-045-01 |                        | Punching (Blue)                                  | *               | 1    |
|          | 82-587-036-01 |                        | Badge (Silver)                                   | *               | 1    |
|          | 82-587-060-01 |                        | Badge (Blue)                                     | *               | 1    |
|          | 82-587-009-01 |                        | Side panel R                                     | *               | 1    |
|          | 82-587-010-01 |                        | Side panel L                                     | *               | 1    |
|          | 82-587-027-01 |                        | Panel, Front                                     | *               | 1    |
|          | 82-563-032-01 |                        | Cassette plate                                   | CS-990          | 1    |
|          | 82-587-003-01 |                        | Window, Dial                                     | *               | 1    |
|          | 82-587-221-01 |                        | E-spring (tact)                                  | *               | 1    |
|          | 82-587-040-01 |                        | Label, DSL                                       | *               | 1    |
|          | 82-587-239-01 |                        | P-spring, Tact A                                 | *               | 1    |
|          | 87-392-003-01 |                        | Nut, Speed                                       |                 | 2    |
|          | 87-321-097-21 |                        | QT <sub>1</sub> + 3 - 12                         |                 | 6    |
| 1-2      | 82-587-635-01 |                        | Drone cone ass'y                                 | *               | 1    |
| 1-3      | 82-587-227-01 |                        | P-spring, Earth                                  | *               | 1    |
| 1-4      | 82-576-241-01 |                        | E-spring, Earth                                  | CS-350          | 1    |
| 1-5      | 82-587-020-01 |                        | Tact push-key                                    | *               | 12   |
| 1-6      | 82-587-021-01 |                        | Push-button                                      | *               | 2    |
| 1-7      | 82-587-218-01 |                        | T-spring, Cassette lid                           | *               | 1    |
| 1-8      | 82-587-202-01 |                        | Cassette box                                     | *               | 1    |
| 1-9a     | 82-587-004-01 |                        | Window, Cassette (Silver)<br>(H,U,UC model only) | *               | 1    |
| 1-9b     | 82-587-047-01 |                        | Window, Cassette (Blue)                          | *               | 1    |
| 1-10     | 82-587-011-01 |                        | Decorative panel, Cassette                       | *               | 1    |
| 1-11     | 87-081-979-01 |                        | Decorative screw 3-12                            |                 | 2    |
| 1-12     | 82-587-219-01 |                        | P-spring, Cassette holder                        | *               | 2    |
| 1-13a    | 09-017-841-01 |                        | Back cover ass'y (H,HG model only)               | *               | 1    |
| 1-13b    | 09-017-842-01 |                        | Back cover ass'y (U,UC model only)               | *               | 1    |
|          | 82-587-038-01 |                        | Back cover ass'y (H,HG model only)               | *               | 1    |
|          | 82-587-042-01 |                        | Back cover ass'y (U,UC model only)               | *               | 1    |
|          | 82-587-236-01 |                        | Rubber cushion 4-6-4                             | *               | 2    |
|          | 82-587-213-01 |                        | C-spring, Terminal A                             | *               | 1    |
|          | 82-587-214-01 |                        | C-spring, Terminal B                             | *               | 1    |
|          | 82-587-216-01 |                        | C-spring, Terminal C                             | *               | 1    |
|          | 82-587-215-01 |                        | Terminal plate U <sub>1</sub>                    | *               | 1    |
|          | 82-587-217-01 |                        | Terminal plate U <sub>3</sub>                    | *               | 1    |
|          | 82-587-226-01 |                        | Sheet, Faiber                                    | *               | 2    |
|          | 82-277-382-01 |                        | Spring, Terminal                                 |                 | 1    |
|          | 81-235-211-01 |                        | Terminal plate D                                 |                 | 1    |
|          | 87-349-095-21 |                        | UT <sub>1</sub> + 3 - 8                          |                 | 1    |
| 1-14     | 82-534-203-01 |                        | Click plate spring R                             |                 | 1    |
| 1-15     | 82-587-212-01 |                        | Shaft, Handle                                    | *               | 2    |
| 1-16     | 82-587-231-01 |                        | Rubber bushing 6 x 10                            | *               | 1    |
| 1-17     | 82-587-233-01 |                        | Rubber bushing 7 x 10                            | *               | 1    |
| 1-18     | 87-038-039-01 |                        | Wire binder                                      |                 | 2    |
| 1-19     | 82-587-208-01 |                        | Rubber bushing 3 x 5                             | *               | 1    |
| 1-20     | 82-587-013-01 |                        | Handle L   | *               | 1    |
| 1-21     | 82-587-014-01 |                        | Handle grip                                      | *               | 1    |
| 1-22     | 82-587-012-01 |                        | Handle R   | *               | 1    |
| 1-23     | 82-587-005-01 |                        | Battery room lid                                 | *               | 1    |
| 1-24     | 82-587-237-01 |                        | M cushion 14 x 35 x 5                            | *               | 1    |
| 1-25a    | 82-587-211-01 |                        | Cushion, Battery (H,HG model only)               | *               | 2    |
| 1-25b    | 82-588-223-01 |                        | M cushion 7 x 281 x 7                            | CS-770          | 2    |
| 1-26     | 82-587-017-01 |                        | Knob   | *               | 4    |
| 1-27     | 82-563-014-01 |                        | Knob, TOGGLE                                     | CS-990          | 4    |
| 1-28     | 82-587-023-01 |                        | Knob, VOLUME (UP)                                | *               | 1    |
| 1-29     | 82-587-024-01 |                        | Knob, VOLUME (DOWN)                              | *               | 1    |
| 1-30a    | 82-587-029-01 |                        | Name plate, Spec. (H model only)                 | *               | 1    |
| 1-30b    | 82-587-033-01 |                        | Name plate, Spec. (HG model only)                | *               | 1    |
| 1-30c    | 82-587-032-01 |                        | Name plate, Spec. (U,UC model only)              | *               | 1    |
| 1-31a    | 82-587-025-01 |                        | AC jack plate (H,HG model only)                  | *               | 1    |
| 1-31b    | 82-587-026-01 |                        | AC jack plate (U,UC model only)                  | *               | 1    |
| 1-31c    | 82-587-034-01 |                        | AC jack plate S-1 (UC model only)                | *               | 1    |
| 1-31d    | 82-587-035-01 |                        | AC jack plate S-2 (U,UC model only)              | *               | 1    |

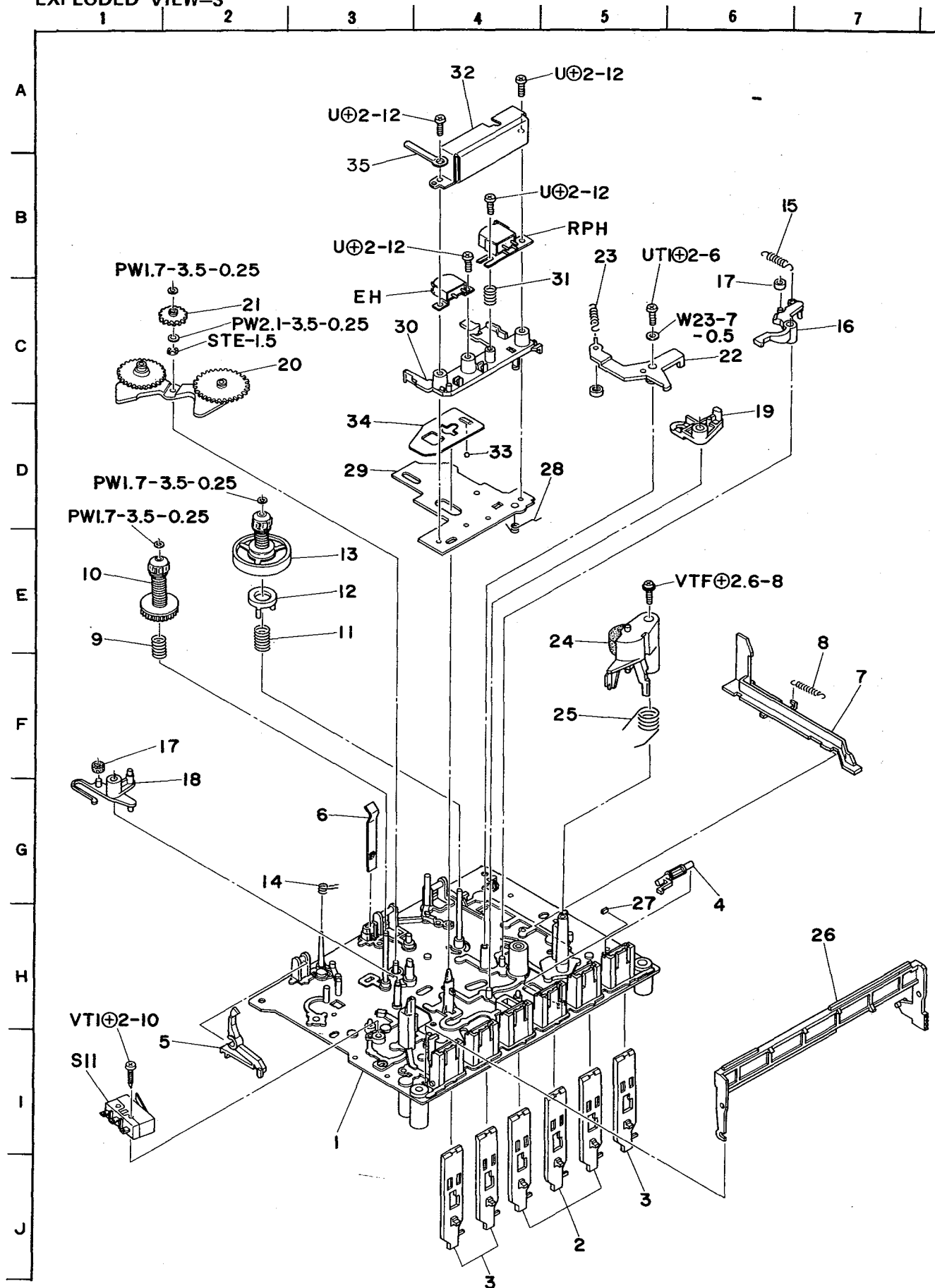
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
|---|---|---|---|---|---|





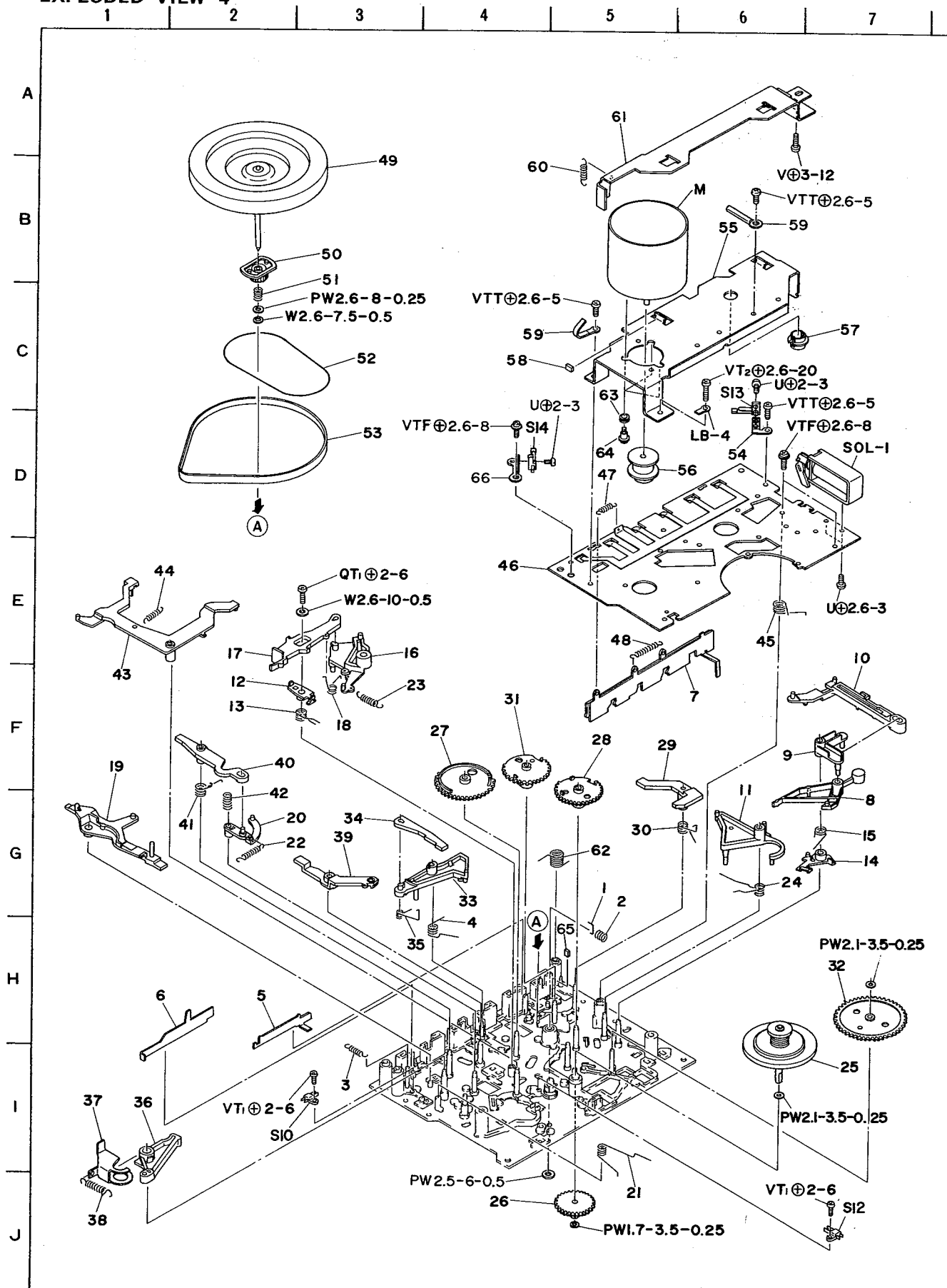
| Ref. No. | Part No.      | Part No.<br>Changed to | Description                                | Common<br>Model | Q'ty             |  |
|----------|---------------|------------------------|--|-----------------|------------------|--|
| 2-1      | 87-043-058-01 |                        | Whip antenna                               |                 | 2                |  |
| 2-2      | 87-033-166-01 |                        | Antenna terminal                           |                 | 2                |  |
| 2-3      | 82-587-220-01 |                        | Terminal plate, Antenna                    | *               | 2                |  |
| 2-4      | 82-587-205-01 |                        | Rod, REC                                   | *               | 1                |  |
| 2-5      | 82-588-209-01 |                        | Cushion 15 x 15 x 41                       | CS-770          | 1                |  |
| 2-6      | 82-587-242-01 |                        | Sheet, Fiber A                             | *               | 2                |  |
| 2-7      | 82-587-211-01 |                        | Cushion, Battery                           | *               | 1                |  |
| 2-8      | 82-587-225-01 |                        | Rod 37.8                                   | *               | 1                |  |
| 2-9      | 82-587-206-01 |                        | Rod 87.8                                   | *               | 2                |  |
| 2-10     | 82-587-608-01 |                        | Shield, Front                              | *               | 1                |  |
| 2-11     | 82-587-238-01 |                        | Rubber cushion 10 x 25 x 14                | *               | 1                |  |
| 2-12     | 82-587-201-01 |                        | Chassis                                    | *               | 1                |  |
| 2-13     | 82-587-207-01 |                        | Holder, Dial plate                         | *               | 2                |  |
| 2-14     | 82-162-037-01 |                        | Push-button B <sub>2</sub>                 | AD-R500         | H,U,UC:4<br>HG:3 |  |
| 2-15     | 82-588-634-01 |                        | Earth, REC                                 | CS-770          | 1                |  |
| 2-16a    | 82-587-008-01 |                        | Dial plate (Silver)<br>(H,U,UC model only) | *               | 1                |  |
| 2-16b    | 82-587-061-01 |                        | Dial plate (Blue)<br>(H,HG model only)     | *               | 1                |  |
| 2-16c    | 82-587-062-01 |                        | Dial plate (Blue)<br>(U,UC model only)     | *               | 1                |  |
| 2-17     | 87-064-084-01 |                        | Holder, ECM 30                             |                 | 2                |  |
| 2-18     | 82-587-019-01 |                        | Push-key, REC mute                         | *               | 1                |  |
| 2-19     | 82-563-247-01 |                        | E-spring, Air-damp                         | CS-990          | 1                |  |
| 2-20     | 87-096-045-01 |                        | String, Dial                               |                 | 1                |  |
| 2-21     | 87-078-003-01 |                        | Air-damp unit ass'y                        |                 | 1                |  |
| 2-22     | 82-587-240-01 |                        | LED reflector                              | *               | 1                |  |
| 2-23     | 82-587-224-01 |                        | Holder, Switch                             | *               | 1                |  |
| 2-24     | 87-040-143-01 |                        | Counter                                    |                 | 1                |  |
| 2-25     | 82-587-209-01 |                        | Rubber belt                                | *               | 1                |  |
| 2-26     | 82-587-203-01 |                        | Holder, Counter                            | *               | 1                |  |
| 2-27     | 82-587-037-01 |                        | Push-key, REC                              | *               | 1                |  |
| 2-28     | 82-587-018-01 |                        | Push-key, Tape recorder                    | *               | 5                |  |
| 2-29     | 82-588-208-01 |                        | Rubber cushion 33-6-3                      | CS-770          | 1                |  |
| 2-30     | 87-063-113-01 |                        | Cushion WA                                 |                 | 2                |  |
| 2-31     | 82-587-049-01 |                        | Push-button, DSL                           | *               | 1                |  |

## EXPLODED VIEW-3



| Ref. No. | Part No.      | Part No.<br>Changed to | Description                 | Common<br>Model | Q'ty |  |
|----------|---------------|------------------------|-----------------------------|-----------------|------|--|
| 3-1      | 82-585-325-01 |                        | Outsert chassis             | -               | 1    |  |
| 3-2      | 82-585-277-01 |                        | Plate button, FR            |                 | 3    |  |
| 3-3      | 82-585-337-01 |                        | Plate button, REC           |                 | 3    |  |
| 3-4      | 82-585-279-01 |                        | Lever A, Eject              |                 | 1    |  |
| 3-5      | 82-585-255-01 |                        | REC blocking lever          |                 | 1    |  |
| 3-6      | 82-585-319-01 |                        | P-spring, Cassette pressure |                 | 1    |  |
| 3-7      | 82-585-254-01 |                        | Slide plate, Eject          |                 | 1    |  |
| 3-8      | 82-585-311-01 |                        | E-spring, Lid lock          |                 | 1    |  |
| 3-9      | 82-585-290-01 |                        | C-spring, Back tension      |                 | 1    |  |
| 3-10     | 82-585-215-01 |                        | Supply reel platform ass'y  |                 | 1    |  |
| 3-11     | 82-585-292-01 |                        | C-spring, Slip disk         |                 | 1    |  |
| 3-12     | 82-585-272-01 |                        | Slip disk T                 |                 | 1    |  |
| 3-13     | 82-585-210-01 |                        | Take-up reel platform ass'y |                 | 1    |  |
| 3-14     | 82-585-294-01 |                        | T-spring, Center shift      |                 | 1    |  |
| 3-15     | 82-585-312-01 |                        | E-spring, Brake R           |                 | 1    |  |
| 3-16     | 82-585-253-01 |                        | Lever, Brake R              |                 | 1    |  |
| 3-17     | 82-585-286-01 |                        | Rubber cushion, Brake       |                 | 2    |  |
| 3-18     | 82-585-252-01 |                        | Lever, Brake L              |                 | 1    |  |
| 3-19     | 82-585-265-01 |                        | REV lever                   |                 | 1    |  |
| 3-20     | 82-585-231-01 |                        | FR lever ass'y              |                 | 1    |  |
| 3-21     | 82-585-235-01 |                        | Gear A, REW                 | CS-770          | 1    |  |
| 3-22     | 82-585-223-01 |                        | Play idler lever ass'y      |                 | 1    |  |
| 3-23     | 82-585-313-01 |                        | F-spring, Play idler        |                 | 1    |  |
| 3-24     | 82-585-364-01 |                        | Pinch lever B ass'y         |                 | 1    |  |
| 3-25     | 82-585-296-01 |                        | T-spring, Pinch lever       |                 | 1    |  |
| 3-26     | 82-585-340-01 |                        | Plate lock ass'y            |                 | 1    |  |
| 3-27     | 82-585-338-01 |                        | Rubber cushion, Play lever  |                 | 1    |  |
| 3-28     | 82-585-295-01 |                        | T-spring, Actuating         |                 | 1    |  |
| 3-29     | 82-585-208-01 |                        | Actuating chassis           |                 | 1    |  |
| 3-30     | 82-585-209-01 |                        | Head base                   |                 | 1    |  |
| 3-31     | 82-585-291-01 |                        | C-spring, RPH               |                 | 1    |  |
| 3-32     | 82-588-628-01 |                        | Shield plate                |                 | 1    |  |
| 3-33     | 87-073-005-01 |                        | Steel ball 2φ               |                 | 1    |  |
| 3-34     | 82-585-284-01 |                        | P-spring, Actuating         |                 | 1    |  |
| 3-35     | 87-038-056-01 |                        | Wire binder                 |                 | 1    |  |

## EXPLODED VIEW-4



| Ref. No. | Part No.      | Part No.<br>Changed to | Description                | Common<br>Model | Q'ty |  |
|----------|---------------|------------------------|----------------------------|-----------------|------|--|
| 4-1      | 82-585-289-01 |                        | Shaft lock                 |                 | 1    |  |
| 4-2      | 82-585-285-01 |                        | C-spring lock              |                 | 1    |  |
| 4-3      | 82-585-317-01 |                        | E-spring, Button lock      | -               | 1    |  |
| 4-4      | 82-585-306-01 |                        | T-spring, Play lever       |                 | 1    |  |
| 4-5      | 82-585-283-01 |                        | Slide plate, FR auto       |                 | 1    |  |
| 4-6      | 82-585-282-01 |                        | Slide plate, Motor switch  |                 | 1    |  |
| 4-7      | 82-585-327-01 |                        | Slide plate key ass'y      |                 | 1    |  |
| 4-8      | 82-585-268-01 |                        | Auto A lever               |                 | 1    |  |
| 4-9      | 82-585-269-01 |                        | Auto B lever               |                 | 1    |  |
| 4-10     | 82-585-270-01 |                        | Plate auto kick            |                 | 1    |  |
| 4-11     | 82-585-248-01 |                        | Lever, PAUSE               |                 | 1    |  |
| 4-12     | 82-585-264-01 |                        | FR lever D                 |                 | 1    |  |
| 4-13     | 82-585-297-01 |                        | T-spring, FR lever A       |                 | 1    |  |
| 4-14     | 82-585-271-01 |                        | Auto eject lever           |                 | 1    |  |
| 4-15     | 82-585-299-01 |                        | T-spring, Auto eject       |                 | 1    |  |
| 4-16     | 82-585-262-01 |                        | FR lever B                 |                 | 1    |  |
| 4-17     | 82-585-263-01 |                        | FR lever C                 |                 | 1    |  |
| 4-18     | 82-585-298-01 |                        | T-spring, FR lever B       |                 | 1    |  |
| 4-19     | 82-585-261-01 |                        | Trigger lever, REC         |                 | 1    |  |
| 4-20     | 82-585-260-01 |                        | Lever, REW                 |                 | 1    |  |
| 4-21     | 82-585-303-01 |                        | T-spring, Trigger (REC)    |                 | 1    |  |
| 4-22     | 82-585-308-01 |                        | E-spring, REW lever        |                 | 1    |  |
| 4-23     | 82-585-341-01 |                        | E-spring, FR lever         |                 | 1    |  |
| 4-24     | 82-585-300-01 |                        | T-spring, FR cam           |                 | 1    |  |
| 4-25     | 82-585-217-01 |                        | Slip pulley FR ass'y       |                 | 1    |  |
| 4-26     | 82-585-216-01 |                        | Drive gear                 |                 | 1    |  |
| 4-27     | 82-585-244-01 |                        | Play cam gear              |                 | 1    |  |
| 4-28     | 82-585-245-01 |                        | FR cam gear                |                 | 1    |  |
| 4-29     | 82-585-256-01 |                        | Trigger lever, PAUSE       |                 | 1    |  |
| 4-30     | 82-585-304-01 |                        | T-spring, Trigger (PAUSE)  |                 | 1    |  |
| 4-31     | 82-585-246-01 |                        | Gear, PAUSE                |                 | 1    |  |
| 4-32     | 82-585-247-01 |                        | Gear, Auto kick            |                 | 1    |  |
| 4-33     | 82-585-249-01 |                        | PLAY lever                 |                 | 1    |  |
| 4-34     | 82-585-250-01 |                        | Lever, REC drive           |                 | 1    |  |
| 4-35     | 82-585-307-01 |                        | T-spring, REC lever        |                 | 1    |  |
| 4-36     | 82-585-266-01 |                        | REC A lever                |                 | 1    |  |
| 4-37     | 82-585-267-01 |                        | REC B lever                |                 | 1    |  |
| 4-38     | 82-585-314-01 |                        | E-spring, REC              |                 | 1    |  |
| 4-39     | 82-585-258-01 |                        | Trigger lever, PLAY        |                 | 1    |  |
| 4-40     | 82-585-259-01 |                        | Trigger lever, REW         |                 | 1    |  |
| 4-41     | 82-585-308-01 |                        | T-spring, REW lever        |                 | 1    |  |
| 4-42     | 82-585-331-01 |                        | C-spring, REW lever        |                 | 1    |  |
| 4-43     | 82-585-257-01 |                        | FF trigger lever           |                 | 1    |  |
| 4-44     | 82-585-301-01 |                        | E-spring, Trigger PLAY     |                 | 1    |  |
| 4-45     | 82-585-321-01 |                        | T-spring, Auto kick        |                 | 1    |  |
| 4-46     | 82-585-203-01 |                        | Mechanism chassis B ass'y  |                 | 1    |  |
| 4-47     | 82-585-315-01 |                        | E-spring, Slide plate      |                 | 1    |  |
| 4-48     | 82-585-332-01 |                        | E-spring, REC lock         |                 | 1    |  |
| 4-49     | 82-585-229-01 |                        | Flywheel ass'y             |                 | 1    |  |
| 4-50     | 82-585-243-01 |                        | Gear, Flywheel             |                 | 1    |  |
| 4-51     | 82-585-324-01 |                        | C-spring, Flywheel         |                 | 1    |  |
| 4-52     | 82-585-336-01 |                        | Rubber belt FR B           |                 | 1    |  |
| 4-53     | 82-585-287-01 |                        | Rubber belt, Flywheel      |                 | 1    |  |
| 4-54     | 82-585-323-01 |                        | Holder, Pause switch       |                 | 1    |  |
| 4-55     | 82-585-281-01 |                        | Holder, Motor              |                 | 1    |  |
| 4-56     | 82-585-242-01 |                        | Motor pulley               |                 | 1    |  |
| 4-57     | 82-585-326-01 |                        | Thrust bearing B           |                 | 1    |  |
| 4-58     | 82-588-206-01 |                        | Rubber cushion, REC lever  | CS-770          | 1    |  |
| 4-59     | 87-038-039-01 |                        | Wire binder                |                 | 1    |  |
| 4-60     | 82-587-241-01 |                        | E-spring, Slide plate      | *               | 1    |  |
| 4-61     | 82-587-228-01 |                        | Slide plate REC ass'y      | *               | 1    |  |
| 4-62     | 82-585-335-01 |                        | T-spring, Plate lock       |                 | 1    |  |
| 4-63     | 87-087-029-01 |                        | Rubber cushion             |                 | 3    |  |
| 4-64     | 87-081-483-01 |                        | Motor screw, M2.6          |                 | 3    |  |
| 4-65     | 82-585-342-01 |                        | Rubber cushion, PAUSE lock |                 | 1    |  |
| 4-66     | 82-587-232-01 |                        | Holder, REC switch         | *               | 1    |  |

## Description of Circuitry

## 1. Block Diagram of Synthesizer Tuner

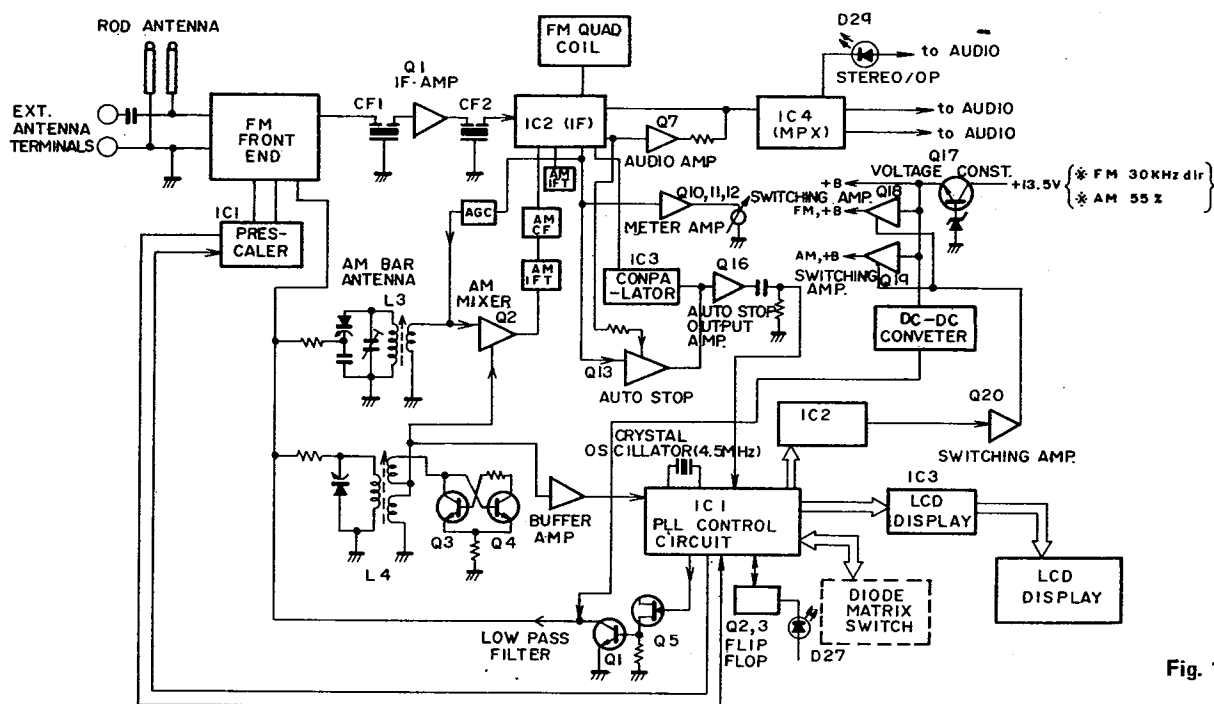


Fig. 1

## 2. Outline of PLL Frequency Synthesizer

The PLL (phase-locked loop) frequency synthesizer is a circuit which uses the extremely stable frequency of a crystal oscillator as the reference signal to produce the frequencies desired. For instance, to pick up a station broadcasting on a frequency of 100 MHz, a local oscillation frequency ( $f_o$ : output frequency of voltage-controlled oscillator) supplied to the mixer of 110.7 MHz ( $100 + 10.7$ ) is required. This particular unit adopts a prescaler which employs a pulse swallow system to divide the frequency, and send it to the programmable counter inside the controller IC. The output frequency  $f_n$  then enters the phase comparator. The frequency of the extremely stable 4.5 MHz crystal oscillator is counted down (1/180) at the same time and the reference frequency  $f_{ref}$  of 25 kHz is sent to the phase comparator. The phases of  $f_n$  and  $f_{ref}$  are compared and the difference between the two is detected. If there is no difference, the loop is locked; if there is a difference, the control voltage passes through the low-pass filter, it is fed out to the VCO and the VCO is controlled until  $f_n$  is made equivalent to 25 kHz. The reference frequency  $f_{ref}$  for AM reception is 9 kHz (or 10 kHz). The VCO frequency signal is sent directly to the programmable counter.

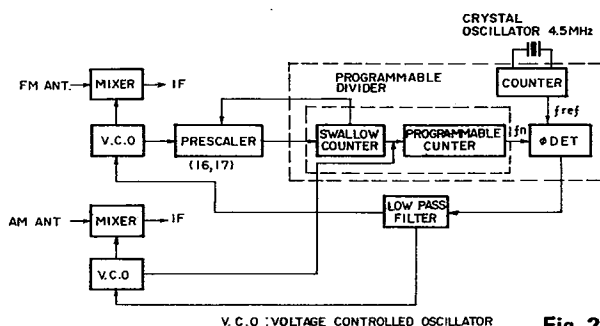


Fig. 2

## 2-1. Operation During FM Reception

The pulse swallow system is first outlined.

The relationship between  $f_{osc}$  and  $f_{ref}$  is expressed as:

$$f_{osc} = N \times f_{ref} \quad (1)$$

If  $N$  is assumed to be  $P$  notation:

$$f_{osc} = (n_1 + p n_2 + p^2 n_3 + \dots + p^{n-1} n_n) f_{ref}$$

$$= P (n_1 / P + n_2 + p n_3 + \dots + p^{n-2} n_n) f_{ref}$$

If, now, the part including the second digit and above is made  $N_p$ :

$$f_{osc} = P (n_1 / P + N_p) f_{ref}$$

This is modulated to become:

$$f_{osc} = (n_1 + P N_p + P n_1 - P n_1) f_{ref}$$

$$= [(N_p - n_1) P + n_1 (P + 1)] f_{ref} \quad (2)$$

The above represents the principle of the pulse swallow system. In order to achieve the relationship expressed in formula (2) by physical means, this unit has a prescaler with two frequency division ratios, 1/16 and 1/17. In formula (1), this corresponds to  $P = 16$ . Actual operation is as follows: when the signal produced by dividing  $f_{osc}$  by  $(P + 1)$  is counted down  $n_1$  times at the first programmable divider digit and  $n_1$  becomes 0, the  $P$ -divided signal is counted down  $(N_p - n_1)$  times equivalent to the number of the first digit subtracted from the number of the second and higher digits of the programmable divider, and the cycle ends. This cycle is performed with  $f_{ref}$  equal to 25 kHz.

When  $f_s = 100$  MHz is received:

$$f_{IF} \text{ is } 10.7 \text{ MHz and so therefore } f_{osc} = 100 + 10.7 = 110.7 \text{ MHz}$$

$$\text{From formula (1): } N = \frac{110.7 \text{ MHz}}{25 \text{ KHz}} = 4428$$

If this figure is re-expressed in the sexadecimal notation, and made to correspond with 114C formula (2):

$$N_p = 114, n_1 = C$$

$$\text{Therefore, } f_{ref} \times [(114 - C) \times 10 + C \times 11] = f_{osc}$$

If this is re-expressed in the decimal notation:

$$25 \text{ kHz} \times [(16^2 + 16^1 + 4 - 12) \times 16 + 12 \times 17] = 110.7 \text{ MHz}$$

What happens is that the prescaler divides the frequency by 1/17 for the first 12 counts and then by 1/16 until 264 counts, and this switching operation is repeated. The swallow counter is locked at 12 and the programmable counter is locked at 264.



- The function in parentheses is displayed by key operation based on a momentary switch (marked  $\overline{\text{ON}}$ ).
- Manual/auto selection (\*1)**  
Manual/auto selection is performed by a fixed switch but in this unit the key operations are carried out with momentary switches which, thanks to the flip-flop circuit, have the same functions as fixed switches.  
When connected: Auto tuning  
When disconnected: Manual tuning
- LCD static/dynamic selection (\*2)**  
This determines whether the LCD display system should be static or dynamic. In this unit, static specifications apply and so the diode is shorted.
- IF frequency selection (\*3, \*4)**  
Alignment is made with the FM IF frequency by IF<sub>1</sub> and IF<sub>0</sub> shorting and open combinations. The IF frequencies used by this unit are 10.675 MHz, 10.700 MHz and 10.725 MHz and so the combinations appear as follows:

| IF offset frequency | IF <sub>1</sub> | IF <sub>0</sub> |
|---------------------|-----------------|-----------------|
| 10.675 MHz (blue)   | Open            | Shorted         |
| 10.700 MHz (red)    | Open            | Open            |
| 10.725 MHz (orange) | Shorted         | Shorted         |

Color of ceramic filter indicated in parentheses.

- Japan/US use selection (\*5)**  
When connected: US specifications  
When disconnected: Japan specifications
- AM frequency interval selection (\*6)**  
The AM channel frequency intervals are selected to 10 kHz or 9 kHz.  
When connected: 10 kHz  
When disconnected: 9 kHz

### 3-3. LCD driver (MSM5829GS)

Indication is provided on the LCD by connecting the three serial output data from the controller ( $\mu$ PD1703C-515)

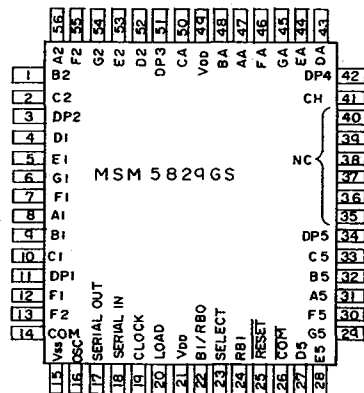
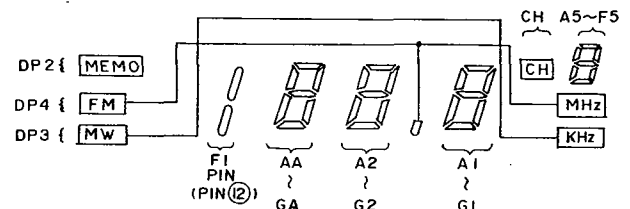


Fig. 7

| Pin no.  | Name  | Function  |
|--|---|---|
| 8, 9, 10, 4<br>5, 7, 6,<br>56, 1, 2, 52<br>53, 55, 54<br>31, 32, 33, 27<br>28, 30, 29<br>47, 48, 50, 43<br>44, 46, 45<br>12, 13<br>11, 3, 51,<br>42, 34,<br>41 | SEGMENT OUT<br>A1, B1, C1, D1<br>E1, F1, G1<br>A2, B2, C2, D2<br>E2, F2, G2<br>A5, B5, C5, D5<br>E5, F5, G5<br>AA, BA, CA, DA<br>EA, FA, GA<br>F1, F2<br>DP1, DP2, DP3,<br>DP4, DP5<br>CH | LCD segment output pins<br>(see Fig. 8*)<br>-   |
| 15   | VSS   | Ground Pin  |
| 16   | OSC   | LCD AC drive frequency pin;<br>with this unit, the circuit is con-<br>figured as below.   |
| 17   | SERIAL OUT  | Not used  |
| 18   | SERIAL IN   | Data indicated with shift regis-<br>ter data input pins are fed into<br>this pin in synchronization with<br>clock pulses. (Connected to pin<br>19 of controller IC)   |
| 19   | CLOCK   | Sync. input pin when data is fed<br>into, or fed out of shift register.<br>(Connected to pin 9 of control-<br>ler IC)   |
| 20   | LOAD  | Input pin for latching shift<br>register contents.<br>High: Shift register contents are<br>transmitted to decoder.<br>Low: Final contents at high<br>level are held (Connect-<br>ed to pin 10 of controller<br>IC)  |
| 21, 49   | VDD   | Power supply pin  |
| 22   | BI/RBO  | Not used  |
| 23   | SELECT  | This function is not used and so<br>pin is always at high level or,<br>in other words, it is connected to<br>VDD.   |
| 24   | RBI   | Pin for determining whether or<br>not leftmost display digit is to<br>indicate a numeral or not. In<br>this unit, it displays only signifi-<br>cant figures and so it is used at<br>the low level, or in other words,<br>it is connected to VSS (ground). |
| 25   | RESET   | Pin for switching display to<br>segment or dot; since segment is<br>used in this unit, it is set to high<br>level or, in other words, it is<br>connected to VDD.  |
| 26   | COM   | This pin feeds out an output<br>with the reverse phase to that of<br>COM. In this unit, it is not used<br>for direct display but for AM<br>and FM +B selection as men-<br>tioned later.   |
| 14   | COM   | This pin feeds out a signal with<br>the reverse phase to that of out-<br>put and 7 segments for AC<br>drive of the LCD; it drives the<br>LCD common pin.  |
| 35, 36, 37<br>38, 39, 40   |   | Not used  |



LCD DISPLAY

Fig. 8



#### 4. Other Circuits

##### 4-1. FM/AM +B Power Selector Circuit

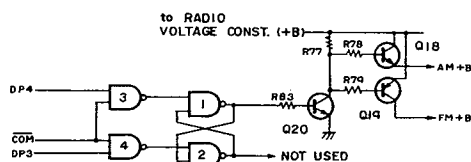
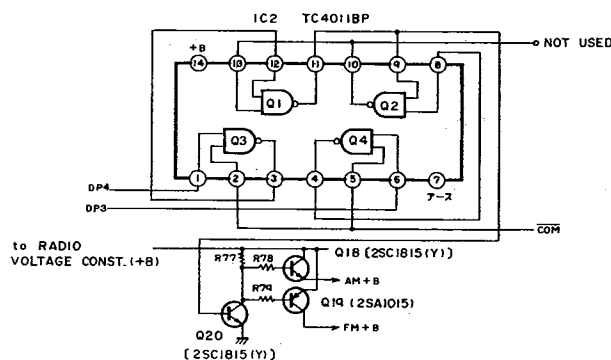


Fig. 9

Switching is performed with a 4-NAND gate IC (IC2).

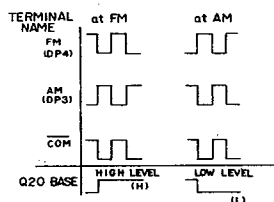


Fig. 10

When the FM band selector key is depressed, pulses with the same phase are fed out to IC3 (MSG5829G) DP4 and COM. As this output passes through the NAND gate IC (TC4011BP), a high level output is produced at NAND gate 1 output and this causes Q20 to turn ON. As a result, Q19 turns ON and the FM +B is obtained. With AM reception, no output appears at DP4, the NAND gate 1 output is set to the low level and with Q20 OFF, Q18 turns ON and the AM +B is obtained.

##### 4-2. Scan Auto Stop Circuit

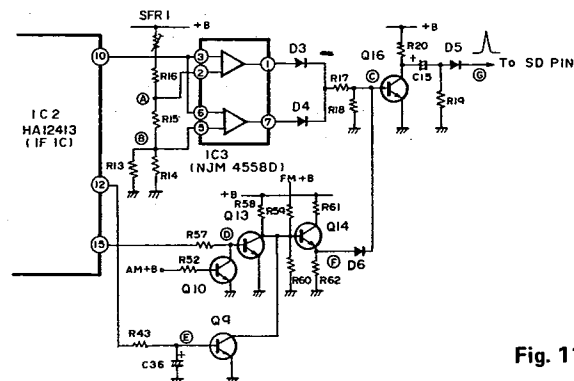


Fig. 11

##### 4-2-1. Operation During FM Reception

The S-curve output pin 10 and meter output pin 15 of IF IC (IC2, HA12413) are used. If pin 10 has a voltage where  $V(B) < V(10) < V(A)$  with respect to the preset point A and point B voltages (about  $\pm 0.5$  V with respect to pin 10 voltage during tuning), no output appears at point (C) and when there is an output at pin 15, point (F) is set to a low level and no signal is fed out to point (C). A trigger pulse is produced at point (G) by the above two AND circuits, this is applied to the SD pin of the controller IC and the scanning is stopped.

##### 4-2-2. Operation During AM Reception

The IF output from pin 12 is smoothed and point (F) is reduced to the low level by the output. As with FM reception, a trigger pulse is produced at point (G) and the scanning stops. [IC3 (NJM4558D) does not work during AM reception.]

##### 5. Dynamic Super Loudness (DSL) Circuit

If the DSL circuit is compared with the loudness circuit, it is seen that both function to boost the low-range (bass) and high-range (treble) frequencies with respect to the midrange frequencies but there are the following major differences.

##### 5-1. Characteristics

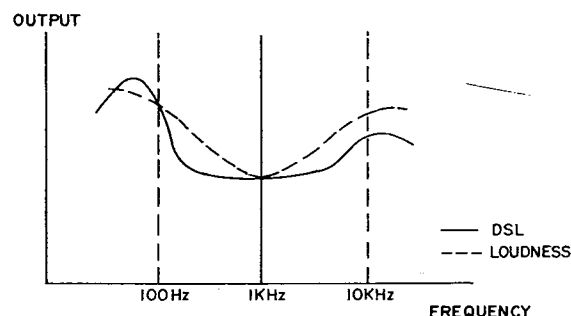


Fig. 12

The loudness system functions to boost the midrange frequencies too. However, the DSL system keeps this increase down to the bare minimum.

With the loudness system, the characteristics do not change with the strength of the signal entering the volume control for providing a tape in the control [normally scale unit 5 (center position)], and the volume control's tap position is mechanical,

meaning that the characteristics change. At a scale position lower than the volume control's tap position, the loudness characteristics are provided regardless of the strength of the sound level and, in contrast, even when the sound level is low, the effect is impaired by the control's scale position.

However, the DSL system judges the strength of the sound level by electrical means and features a configuration which produces dynamic super loudness characteristics.

## 5-2. DSL Circuit Configuration

The DSL circuit comprises the equalizer circuit which produces the DSL characteristics, the detector circuit which judges the strength of the sound level and the control circuit which suppresses the DSL characteristics when the sound is high.

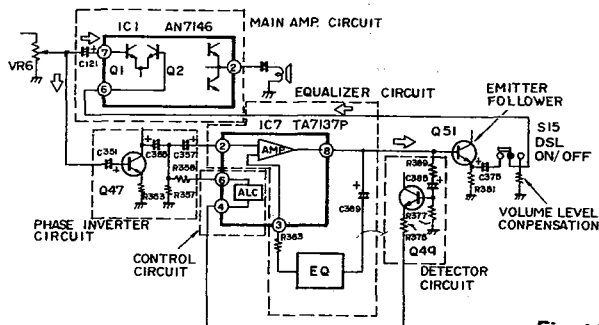


Fig. 13

### 5-2-1. Equalizer Circuit

An ordinary direct-coupled amplifier feedback circuit (T-type bridge circuit) is provided with time constants, and its characteristics generated.

Two T-type bridge circuits are connected in series and the time constants are divided into the left side for bass [R361, 359, C359, 361] and right side for treble,

The characteristics of each of the twin filters connected to pins 3 and 8 of IC351 (TA7137P) are attenuated by frequency  $f_1$  determined by constants  $R_1$ ,  $R_2$  and  $C_1$ .

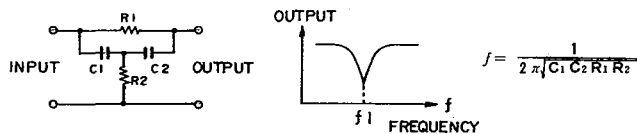


Fig. 14

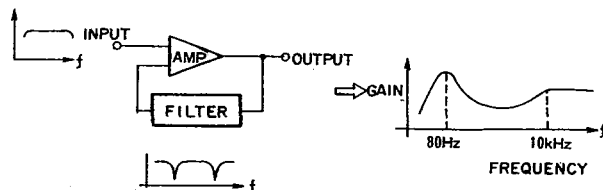


Fig. 15

### 5-2-2. Detector Circuit

The level of this circuit is set by the frequency division ratio of two resistors.

### 5-2-3. Control Circuit

This circuit is the same as an ALC circuit used for normal recording although it differs in that its attack time and recovery time are extremely short.

Because of the boosted level, the output must be not distorted. When a signal exceeding a certain fixed level is fed out, it is taken out by the Q49 emitter, the IC7 ALC circuit functions and the input of pin 2 is controlled.

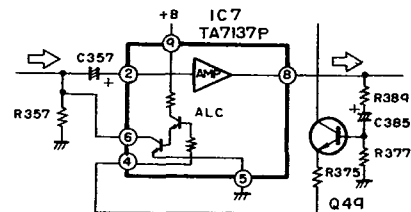


Fig. 16

The DSL circuit with the above-mentioned configuration is mixed with a main amplifier. The IC1 (AN7146) input has a differential amplifier configuration, and when a flat signal enters transistor Q1 at one side of the differential amplifier from the volume control, a flat signal also enters the DSL circuit simultaneously. Q2 is basically a negative feedback pin but when the output (signal with DSL characteristics) of the DSL circuit is fed into the Q2 input, differential operation is provided by Q1 and Q2.

The DSL block input transistor Q47 is used to invert the phase. As a result, the phase is inverted at the DSL block input and output sides and so the differential operation of Q1 and Q2 becomes a mixing operation. Meanwhile, the feedback from the output inside IC7 does not change and negative feedback operation results.

When the signal level is low in Fig. 13, there is a high degree of mixing by Q1 and Q2 inside IC1 so that the DSL feeds out a strong signal, and the bass and treble are greatly boosted. However, when the signal level is high, the DSL block output is suppressed, the amount of mixing by Q1 and Q2 inside IC1 is reduced, and since the Q2 input is reduced to a fraction, almost all of it becomes the signal fed in from Q1.

The resistor inserted across the ground and OFF side pin of the DSL ON/OFF switch functions to compensate for the difference in the volume when the switch is selected.

## ACCESSORIES/PACKAGE

| Ref. No. | Part No.      | Part No.<br>Changed to | Description                                 | Common<br>Model | Q'ty |
|----------|---------------|------------------------|---|-----------------|------|
| 1        | 82-587-855-01 |                        | Printed indiv., Packing                     | *               | 1    |
| 2        | 82-587-852-21 |                        | Cushion L, Printed indiv.                   | *               | 1    |
| 3        | 82-587-853-21 |                        | Cushion R, Printed indiv.                   | *               | 1    |
| 4        | 87-051-137-11 |                        | Poly-vinyl sack                             |                 | 1    |
| 5        | 87-056-626-01 |                        | Poly-vinyl sack                             |                 | 1    |
| 6a       | 82-587-904-01 |                        | Instructions booklet (H,HG model only)      | *               | 1    |
| 6b       | 82-587-905-01 |                        | Instructions booklet (U,UC model only)      | *               | 1    |
| 7        | 82-587-907-01 |                        | Sticker, POP (U model only)                 | *               | 1    |
| 8        | 87-051-171-11 |                        | Poly-vinyl sack (for instruction)           |                 | 1    |
| 9        | 87-056-009-41 |                        | Distributors list (H,HG,UC model only)      |                 | 1    |
| 10a      | 87-056-059-01 |                        | Guarantee card G (HG model only)            |                 | 1    |
| 10b      | 87-056-045-01 |                        | Guarantee card U (U model only)             |                 | 1    |
| 10c      | 87-056-013-01 |                        | Guarantee card C (UC model only)            |                 | 1    |
| 11       | 87-056-050-01 |                        | Safety instruction (U model only)           |                 | 1    |
| 12       | 87-056-057-01 |                        | Service station list (U model only)         |                 | 1    |
| 13       | 87-056-061-01 |                        | Voltage selector instruction (U model only) |                 | 1    |
| 14       | 82-916-740-01 |                        | Tape cassette, DMC-164                      |                 | 1    |
| 15       | 87-032-845-01 |                        | Siemens plug (H model only)                 |                 | 1    |
| 16a      | 87-034-880-01 |                        | AC power cord (H model only)                |                 | 1    |
| 16b      | 87-034-893-01 |                        | AC power cord (HG model only)               |                 | 1    |
| 16c      | 87-034-928-01 |                        | AC power cord (U,UC model only)             |                 | 1    |

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**AIWACO., LTD.**

**ELECTRICAL MAIN PART LIST**

| Symbol No.   | Part No.      | Description                            |
|--|---------------|--|
| <b>◀ TUNER CIRCUIT BOARD SECTION ▶</b>   |               |  |
| PCB-A  | 82-587-609-01 | Tuner circuit board                    |
| CP1  | 82-587-626-01 | FM front end                           |
| IC1  | 87-027-752-01 | IC, 535AC                              |
| IC2  | 87-027-734-01 | IC, HA12413                            |
| IC3  | 87-027-235-01 | IC, NJM4558D                           |
| IC4  | 87-027-430-11 | IC, LA3361                             |
| Q1   | 89-319-233-01 | Transistor, 2SC1923 (O)                |
| Q2   | 89-303-803-01 | Transistor, 2SC380 (O)                 |
| Q3,4,5,7,<br>8,9,10,11,<br>13,14,15,16,<br>18,20,21  | 89-318-154-01 | Transistor, 2SC1815 (Y)                |
| Q6   | 89-318-156-01 | Transistor, 2SC1815 (BL)               |
| Q12,19   | 89-110-154-01 | Transistor, 2SA1015 (Y)                |
| Q17  | 89-403-135-01 | Transistor, 2SD313 (E)                 |
| D1,2   | 87-027-753-01 | Diode, KV1236Z                         |
| D3,4,5,6,<br>7,8,9,11  | 87-027-097-01 | Diode, 1S1555                          |
| D10  | 87-027-431-01 | Zener diode, RD6.2EB2                  |
| L1,8,9   | 87-003-051-01 | Choke coil, 470μH                      |
| L2   | 87-008-227-01 | FM coil                                |
| L3   | 82-587-609-01 | AM bar antenna coil                    |
| L4   | 82-755-607-01 | AM OSC coil                            |
| L5,6   | 87-005-126-01 | Coil, 1mH                              |
| L10  | 87-003-045-01 | Choke coil, 22μH                       |
| L11  | 87-003-064-01 | Choke coil, 0.39μH                     |
| TC1  | 87-011-108-01 | Trimmer, 8pF                           |
| CF1,2  | 87-008-228-01 | Ceramic filter SFE, 10.7 MA5H          |
| CF2  | 87-008-235-01 | Ceramic filter 10.7 (U,UC model only)  |
| CF3  | 87-008-225-01 | AM ceramic filter                      |
| IFT1   | 87-008-226-01 | AM IFT                                 |
| IFT2   | 87-008-223-01 | AM IFT                                 |
| SFR1   | 87-021-566-01 | Semi-fixed resistor, 5kΩ-B             |
| SFR2   | 87-021-567-01 | Semi-fixed resistor, 10kΩ-B            |
| PIN-1  | 87-049-045-01 | Pin, 12P                               |
| <b>&lt; Resistor &gt;</b>  |               |  |
| R50  | 87-025-317-01 | 47Ω ½w Nonflammable resistor           |
| <b>&lt; Capacitors &gt;</b>  |               |  |
| C19  | 87-014-048-01 | 430pF PP                               |
| C48  | 87-014-057-01 | 1000pF PP                              |
| <b>◀ REC/PB CIRCUIT BOARD SECTION ▶</b>  |               |  |
| PCB-B  | 82-587-614-21 | REC/PB circuit board (H,HG model only) |
| PCB-B  | 82-587-657-01 | REC/PB circuit board (U,UC model only) |
| IC1,2  | 87-027-540-01 | IC, AN7146                             |
| IC3,4  | 87-027-754-01 | IC, LM1111C                            |
| IC5,9  | 87-027-539-01 | IC, LA3161                             |
| Q1,2   | 89-322-405-01 | Transistor, 2SC2240 (GR)               |
| Q3,4,5,6,<br>7,8,17,<br>18,19,20,<br>21,22,27,<br>28,29,30,<br>31,32,33,<br>34,35,36,<br>37,38,42,<br>44 | 89-318-154-01 | Transistor, 2SC1815 (Y)                |
| Q39,40   | 89-318-155-01 | Transistor, 2SC1815 (GR)               |
| Q41  | 89-318-464-01 | Transistor, 2SC1846 (R)                |
| Q43  | 89-322-364-01 | Transistor, 2SC2236 (Y)                |

| Symbol No.                                   | Part No.      | Description   |
|--|---------------|---|
| Q45,46                                       | 89-320-011-21 | Transistor, 2SC2001 (K,L)                                     |
| D1,2,5,6,<br>7,8,9,10,<br>11,12,13,15,<br>17 | 87-027-097-01 | Diode, 1S1555   |
| D3,4   | 88-052-188-11 | Diode, 1S188 (FM)   |
| D14  | 87-027-346-01 | Zener diode, HZ11A2L  |
| D16  | 87-027-199-01 | Zener diode, 05Z-15U  |
| L1,2   | 87-008-173-01 | Trap coil, 10mH   |
| L3,4   | 82-487-654-01 | Coil, 10mH  |
| L7,9(13,14)                                  | 87-003-039-01 | Choke coil, 36μH  |
| L8   | 82-401-661-01 | Choke coil, 600μH   |
| L11,12                                       | 87-003-051-01 | Choke coil, 470μH   |
| CP1  | 82-587-641-11 | Bias OSC unit   |
| LPF1   | 87-030-070-01 | Low-pass filter   |
| J1,2,3,4,<br>10                              | 82-587-633-01 | Jack plate ass'y (PHONO/LINE IN, MIC-L,R, PLAYER SYNC)        |
| J5,6,7,8                                     | 82-587-632-01 | Jack plate ass'y (LINE OUT, EXT SP-L,R) (H,HG model only)     |
| J5,6,7,8,S33                                 | 82-587-671-01 | Jack plate ass'y (LINE OUT, EXT SP-L,R IFC) (U,UC model only) |
| J9   | 87-049-043-01 | Jack, 6.3φ (PHONES)   |
| VR1  | 87-021-671-01 | Volume, 50kΩ-A (REC VOLUME)                                   |
| VR2,3  | 87-021-668-01 | Volume, 50kΩ-A (BASS, TREBLE)                                 |
| VR4  | 87-021-669-01 | Volume, 100kΩ-W (BALANCE)                                     |
| VR5  | 87-021-667-01 | Volume, 20kΩ-A (VOLUME)                                       |
| S1   | 87-031-621-01 | Lever switch (FUNCTION)                                       |
| S2   | 82-588-622-11 | Slide switch (REC/PB)   |
| S3   | 87-031-631-01 | Lever switch (TAPE SELECTOR)                                  |
| S4   | 87-031-620-01 | Lever switch (RECORD)   |
| S5   | 82-563-609-01 | Slide switch (PHONO/LINE IN)                                  |
| S6   | 87-031-622-01 | Lever switch (MODE)   |
| S7,8,15                                      | 87-031-619-01 | Push-switch (DOLBY-NR, POWER, DSL)                            |
| S31  | 82-431-604-01 | Slide switch (OSC)  |
| SFR1,2                                       | 87-021-564-01 | Semi-fixed resistor, 1kΩ-B                                    |
| SFR3,7,8                                     | 87-021-624-01 | Semi-fixed resistor, 50kΩ-B                                   |
| SFR4   | 87-021-514-01 | Semi-fixed resistor, 200kΩ-B                                  |
| SFR5,6                                       | 82-587-634-01 | Semi-fixed resistor, 100Ω-B                                   |
|  | 82-588-634-01 | Earth terminal  |
| <b>&lt; Resistors &gt;</b>                   |               |   |
| R83,84                                       | 87-025-209-01 | 3.3kΩ Metal film resistor                                     |
| R153,154,<br>220,245,<br>246                 | 87-025-313-01 | 4.7Ω Nonflammable resistor                                    |
| R164   | 87-025-316-01 | 100Ω ½w Nonflammable resistor                                 |
| ⚠ R202                                       | 87-029-108-01 | 1Ω ½w Fuse resistor   |
| ⚠ R162,163                                   | 87-029-090-01 | 22Ω ½w Fuse resistor  |
| ⚠ R172                                       | 87-029-060-01 | 33Ω ½w Fuse resistor  |
| <b>&lt; Capacitors &gt;</b>                  |               |   |
| C49,50,89,<br>90                             | 87-014-053-01 | 680pF PP  |
| C17,18                                       | 87-014-055-01 | 820pF PP  |
| C13,14,75,<br>76                             | 87-015-311-01 | 0.1μF 10V Aluminum solid                                      |
| C115,116                                     | 87-015-367-01 | 0.15μF 10V Aluminum solid                                     |
| C107,108,<br>117,118                         | 87-015-312-01 | 0.22μF 10V Aluminum solid                                     |
| C77,78                                       | 87-015-313-01 | 0.33μF 10V Aluminum solid                                     |

| Symbol No.  | Part No.      | Description  |
|---|---------------|--|
| <b>≪ CONTROL CIRCUIT BOARD SECTION ≫</b>  |               |  |
| PCB-C   | 82-587-604-01 | Control circuit board  |
| ④ IC1   | 87-027-749-01 | IC, $\mu$ PD1703C515   |
| ④ IC2   | 87-027-564-01 | IC, TC4011BP   |
| ④ IC3   | 87-027-751-01 | IC, MSM5829GS  |
| Q1,2,3,4  | 89-318-154-01 | Transistor, 2SC1815 (Y)  |
| Q5  | 89-500-303-01 | FET, 2SK30 (O)   |
| D1,2,3,4,<br>5,6,7,8,<br>9,10,11,12,<br>13,14,15,16,<br>17,18,19,20,<br>21,22,23,24,<br>25,26 | 87-027-097-01 | Diode, 1S1555  |
| D27,29  | 87-027-716-01 | LED, GL-9PR22<br>(AUTO OPERATE/FM STEREO)                      |
| D28   | 87-027-758-01 | LED, GL-9PG22 (DOLBY-NR)                                       |
| D30   | 82-587-603-01 | LCD (FREQUENCY INDICATOR)                                      |
| X1  | 87-030-083-01 | Crystal resonator  |
| S19,20,21,<br>22,23,24,<br>25,26,27,<br>28,29,30  | 87-031-498-01 | Push-switch (TUNING, DOWN, UP,<br>MEMORY, 1,2,3,4,5,6, FM, AM) |
| PL1,2   | 82-587-605-01 | Pilot lamp   |
|   | 82-587-606-01 | Electric conduction rubber                                     |

|  |               |                                      |
|--|---------------|--------------------------------------|
| <b>≪ MS CIRCUIT BOARD SECTION ≫</b>                      |               |                                      |
| PCB-D  | 82-587-615-21 | MS circuit board (H,HG model only)   |
| PCB-D  | 82-587-659-01 | MS circuit board (U,UC model only)   |
| ④ IC6  | 87-027-713-01 | IC, TC9138P                          |
| Q401,402,403,<br>404,405,411,<br>412,413,414,<br>415,416 | 89-327-854-01 | Transistor, 2SC2785 (E)              |
| Q406   | 89-111-154-51 | Transistor, 2SA1115 (E,F)            |
| Q407,409   | 89-313-834-01 | Transistor, 2SC1383 (S)              |
| Q408   | 89-106-834-51 | Transistor, 2SA683 (RS)              |
| D401   | 87-027-756-01 | LED, SL-1160L (MS PROGRAM)           |
| D402   | 87-027-365-01 | Diode, S5277B                        |
| D403   | 87-027-332-01 | Zener diode, HZ6B1 L                 |
| D404,405,<br>406,407,<br>408,409,<br>410,411,<br>415     | 87-027-097-01 | Diode, 1S1555                        |
| D412,413,<br>414   | 87-027-716-01 | LED, GL-9PR22 (PEAK 0, +3, +7)       |
| D416   | 87-027-228-01 | Zener diode, 05Z-7.5U                |
| S17,18   | 87-031-496-01 | Tact switch (PROGRAM, RESET)         |
| SFR401,402   | 87-021-624-01 | Semi-fixed resistor, 50k $\Omega$ -B |
| <b>&lt; Capacitors &gt;</b>                              |               |                                      |
| C412   | 87-015-318-01 | 0.1 $\mu$ F 10V Aluminum solid       |
| C407   | 87-015-425-01 | 1 $\mu$ F 25V Aluminum solid         |

|                                      |               |                          |
|--------------------------------------|---------------|--------------------------|
| <b>≪ DSL CIRCUIT BOARD SECTION ≫</b> |               |                          |
| PCB-E                                | 82-587-617-21 | DSL circuit board        |
| IC7,8                                | 87-027-176-01 | IC, TA-7137P Stereo type |
| Q47,48,49,<br>50,51,52,<br>73,74     | 89-318-154-01 | Transistor, 2SC1815 (Y)  |
| D351                                 | 87-027-097-01 | Diode, 1S1555            |
| L10                                  | 82-587-610-01 | Coil, DC-DC              |
| PIN-4                                | 87-049-038-01 | Pin, 3P                  |
| PIN-2                                | 82-481-647-01 | Pin, 4P                  |
| PIN-3                                | 87-049-034-01 | Pin, 4P                  |

| Symbol No.                                | Part No.      | Description                          |
|---|---------------|--------------------------------------|
| <b>&lt; Capacitors &gt;</b>               |               |                                      |
| C361,362                                  | 87-015-311-01 | 0.1 $\mu$ F 10V Aluminum solid       |
| C359,360                                  | 87-015-313-01 | 0.33 $\mu$ F 10V Aluminum solid      |
| <b>≪ REC AMP CIRCUIT BOARD SECTION ≫</b>  |               |                                      |
| PCB-F                                     | 82-588-617-11 | REC amp circuit board                |
| Q23,24,25,<br>26                          | 89-318-154-01 | Transistor, 2SC1815 (Y)              |
| L5,6                                      | 87-005-088-01 | Micro inductor, 5.6mH                |
| SFR9,10                                   | 87-021-672-01 | Semi-fixed resistor, 50k $\Omega$ -B |
| <b>&lt; Capacitor &gt;</b>                |               |                                      |
| C81,82                                    | 87-015-311-01 | 0.1 $\mu$ F 10V Aluminum solid       |
| <b>≪ MONITOR CIRCUIT BOARD SECTION ≫</b>  |               |                                      |
| PCB-G                                     | 82-588-633-11 | Monitor circuit board                |
| Q9,10                                     | 89-322-405-01 | Transistor, 2SC2240 (GR)             |
| Q11,12,13,<br>14,15,16                    | 89-318-154-01 | Transistor, 2SC1815 (Y)              |
| PIN                                       | 87-032-634-01 | Pin, 4P                              |
| <b>≪ REC MUTE CIRCUIT BOARD SECTION ≫</b> |               |                                      |
| PCB-H                                     | 82-587-642-21 | REC mute circuit board               |
| Q72                                       | 89-110-154-01 | Transistor, 2SA1015 (Y)              |
| D1  | 87-027-097-01 | Diode, 1S1555                        |
| S9  | 82-587-642-01 | Push-switch (REC MUTE)               |

|   |               |  |
|---|---------------|--|
| <b>≪ LED CIRCUIT BOARD SECTION ≫</b>          |               |  |
| PCB-I   | 82-587-619-21 | LED circuit board                          |
| D1  | 87-027-731-01 | LED, SR-535D (RECORD)                      |
| <b>≪ LIGHT SWITCH CIRCUIT BOARD SECTION ≫</b> |               |  |
| PCB-J   | 82-587-648-21 | Light switch circuit board                 |
| S32   | 86-992-604-01 | Push-switch (LIGHT)                        |
| <b>≪ POWER CIRCUIT BOARD SECTION ≫</b>        |               |  |
| ⚠ PCB-K                                       | 82-551-672-21 | Power circuit board<br>(H,HU model only)   |
| ⚠ PCB-K                                       | 82-587-670-01 | Power circuit board<br>(U,UC model only)   |
| D501  | 87-027-609-01 | Encapsulated diode                         |
| ⚠ J11,12                                      | 87-032-929-01 | AC-DC jack                                 |
| ⚠ S16   | 87-031-466-01 | Slide switch<br>(VOLTAGE SELECTOR)         |
| ⚠ F1  | 87-035-192-01 | Fuse, "T" 4A (H,HG model only)             |
|   | 87-098-022-01 | Fuse label, "T" 4A<br>(H,HG model only)    |
| ⚠ F1  | 87-035-302-01 | Fuse, 3.15A (U,UC model only)              |
| ⚠ F2  | 87-098-045-01 | Fuse label, 3.15A (U,UC model only)        |
|   | 87-035-219-01 | Fuse, "T" 500mA<br>(H,HG model only)       |
|   | 87-098-013-01 | Fuse label, "T" 500mA<br>(H,HG model only) |
| ⚠ F2  | 87-035-293-01 | Fuse, 400mA (U,UC model only)              |
|   | 87-098-036-01 | Fuse label, 400mA<br>(U,UC model only)     |
| ⚠   | 87-033-147-01 | Fuse clamp                                 |
| <b>&lt; Resistor &gt;</b>                     |               |  |
| R501  | 87-025-194-01 | 220 $\Omega$ 2w Metal film resistor        |

|                          |               |  |
|--------------------------|---------------|--|
| <b>≪ MISCELLANEOUS ≫</b> |               |  |
| ⚠ T1                     | 82-587-650-01 | Power transformer<br>(H,HG model only) |
| ⚠ T1                     | 82-587-649-01 | Power transformer<br>(U,UC model only) |
| RPH                      | 87-046-159-01 | REC/PB head                            |

| Symbol No. |    |
|------------|----|
| EH         | 87 |
| SOL1       | 82 |
| SP1,2      | 82 |
| SP3,4      | 82 |
| SP5        | 82 |
| SP5        | 82 |
| LM1,2      | 82 |
| ECM1,2     | 87 |
| M1         | 87 |
| S10,14     | 87 |
| S11        | 87 |
| S12        | 87 |
| S13        | 87 |
| S16        | 87 |
| CON-4      | 82 |
| CON-3      | 82 |
| CON-2      | 82 |
| CON-1      | 82 |
| C1,2       | 82 |

⚠ Safety component  
This symbol is given  
to maintain the safe  
made to conform  
Therefore, when re  
symbol, make also  
signated part.

**C-MOS IC handling**  
The C-MOS IC's co  
damage by static e  
regard to following a  
1. Need to be put c  
box and to be v  
tion and deposit.  
2. To use solder in  
power consumpt  
more than 10 sec  
3. Do not perform  
Refer to the circ  
4. The ICs on the  
an C-MOS IC syrr



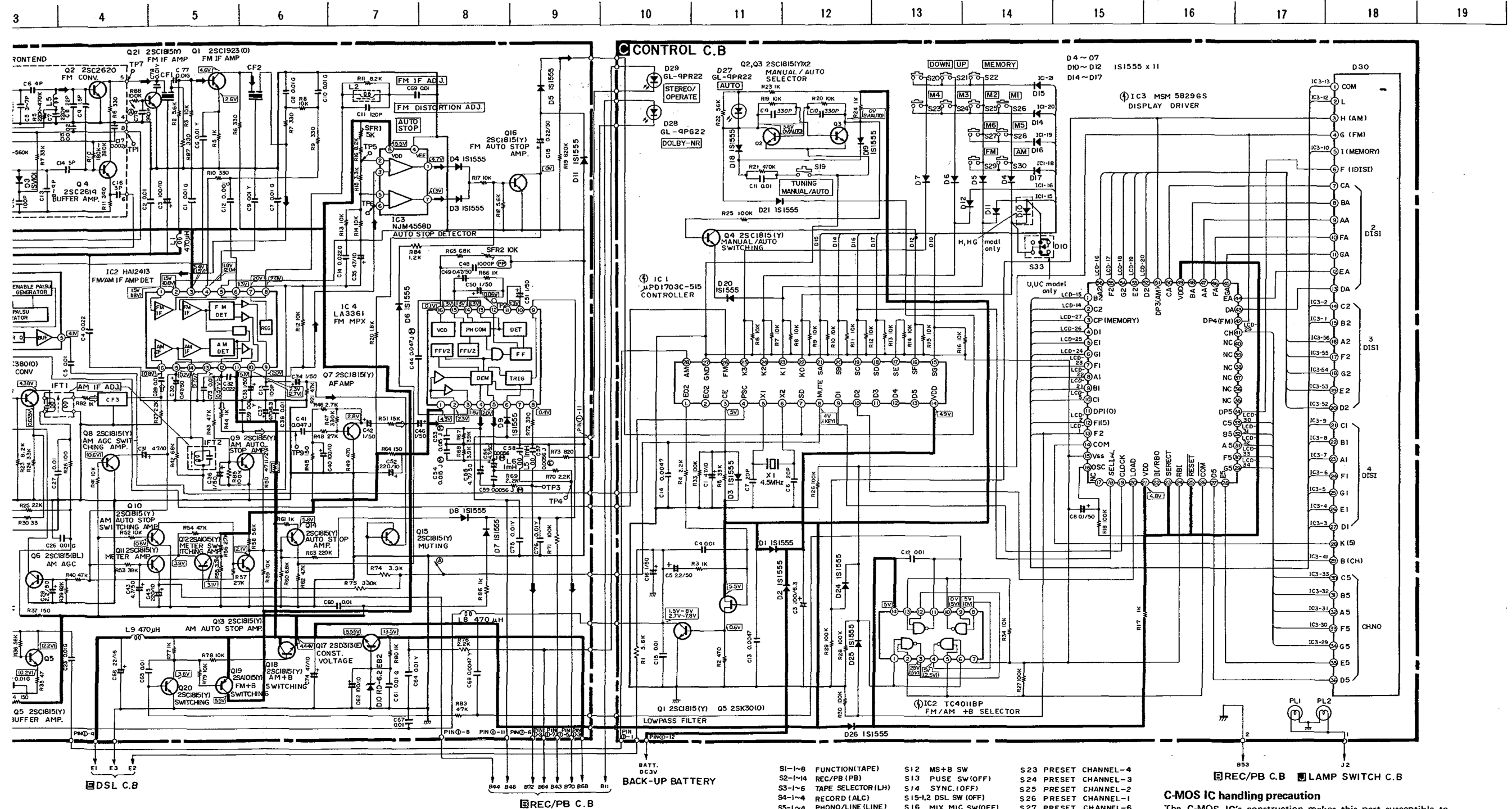
[illegible]

### C-MOS IC handling










The C-MOS IC's can be damaged by static electricity. Refer to following articles.




1. Need to be put on an antistatic box and to be wrapped in antistatic paper before insertion and deposit.
2. To use solder iron with low power consumption, do not use more than 10 seconds.
3. Do not perform soldering. Refer to the circuit.
4. The ICs on the board are C-MOS IC symbols.





value measured with a  
here are no signals.  
n or recording.  
re value was measured  
uring recording.  
have a rated power of  
on have a dielectric

- 6) The only capacitor tolerances indicated are  $\pm 5\%$  and  $\pm 10\%$  (K).
- 7) Ceramic capacitor symbols:
-  For temperature compensation (SL)
  -  High dielectric constant system (YY)
  -  High dielectric constant system (YW, YP, YZ)
- 8) Explanation of symbols
-  Mylar capacitor
  -  Aluminum solid capacitor
  -  Polypropylene film capacitor
  -  Bi-polarized capacitor
  -  Low-leakage capacitor
  -  Tantalum capacitor

 Fuse resistor  
 Nonflammable resistor  
 Low noise resistor

 Safety component symbol

This symbol is given to impor

to maintain the safety of the p

made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

This schematic diagram is subject to change without notice in the interests of improved performance.

|        |                    |
|--------|--------------------|
| S1-1~8 | FUNCTION(TAPE)     |
| S2-1~4 | REC/PB (PB)        |
| S3-1~6 | TAPE SELECTOR(1LH) |
| S4-1~4 | RECORD (ALC)       |
| S5-1~4 | PHONO/LINE (LINE)  |
| S6-1,2 | MODE (STEREO)      |
| S7     | DOLBY-NR           |
| S8     | SLEEP(OFF)         |
| S9     | REC MUT (OFF)      |
| S10    | MOTOR SW(OFF)      |
| S11    | PLAY SW(OFF)       |

```


S12  MS+B SW
S13  PUSE SW(OFF)
S14  SYNC.(OFF)
S15-1,2 DSL SW (OFF)
S16  MIX MIC SW(OFF)
S17  PROGRAM SW(OFF)
S18  RESET SW(OFF)
S19  TUNING
S20  DOWN
S21  UP
S22  MEMORY

```

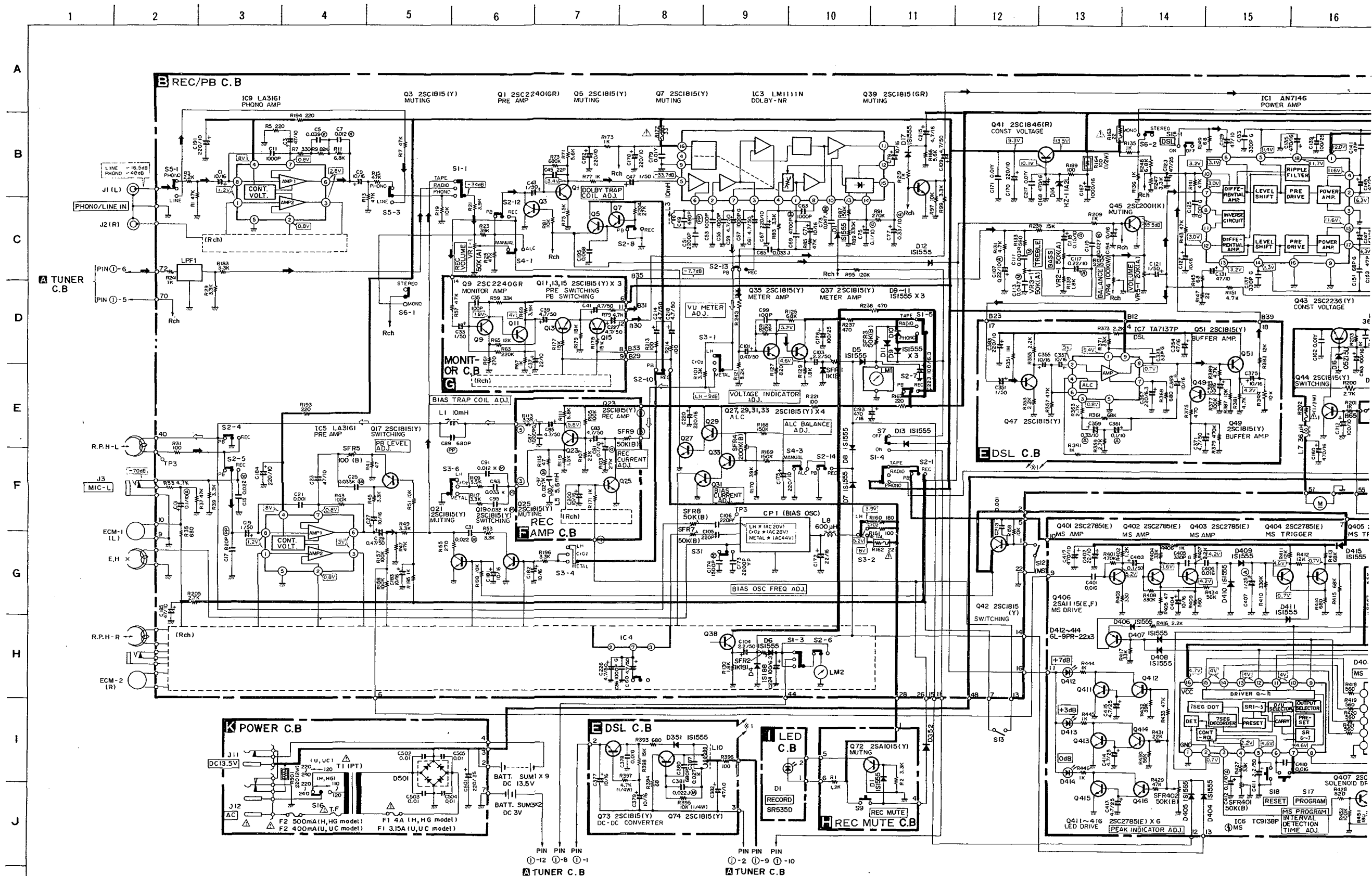
```
S23 PRESET CHANNEL-4
S24 PRESET CHANNEL-3
S25 PRESET CHANNEL-2
S26 PRESET CHANNEL-1
S27 PRESET CHANNEL-6
S28 PRESET CHANNEL-5
S29 FM
S30 AM
S31 OSC
S32 LIGHT
S33 IFC
```

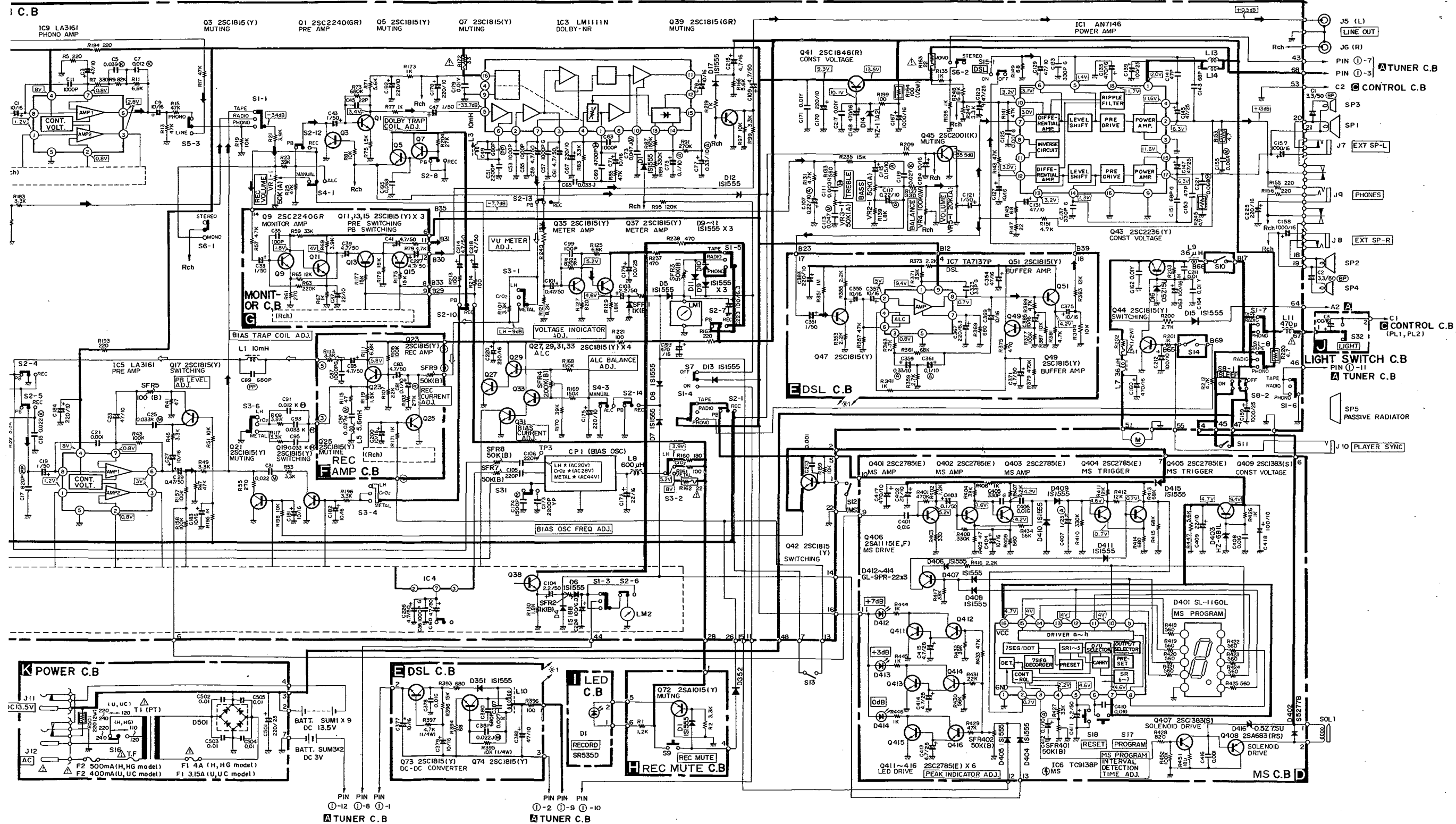
### C-MOS IC handling precaution

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (  ).

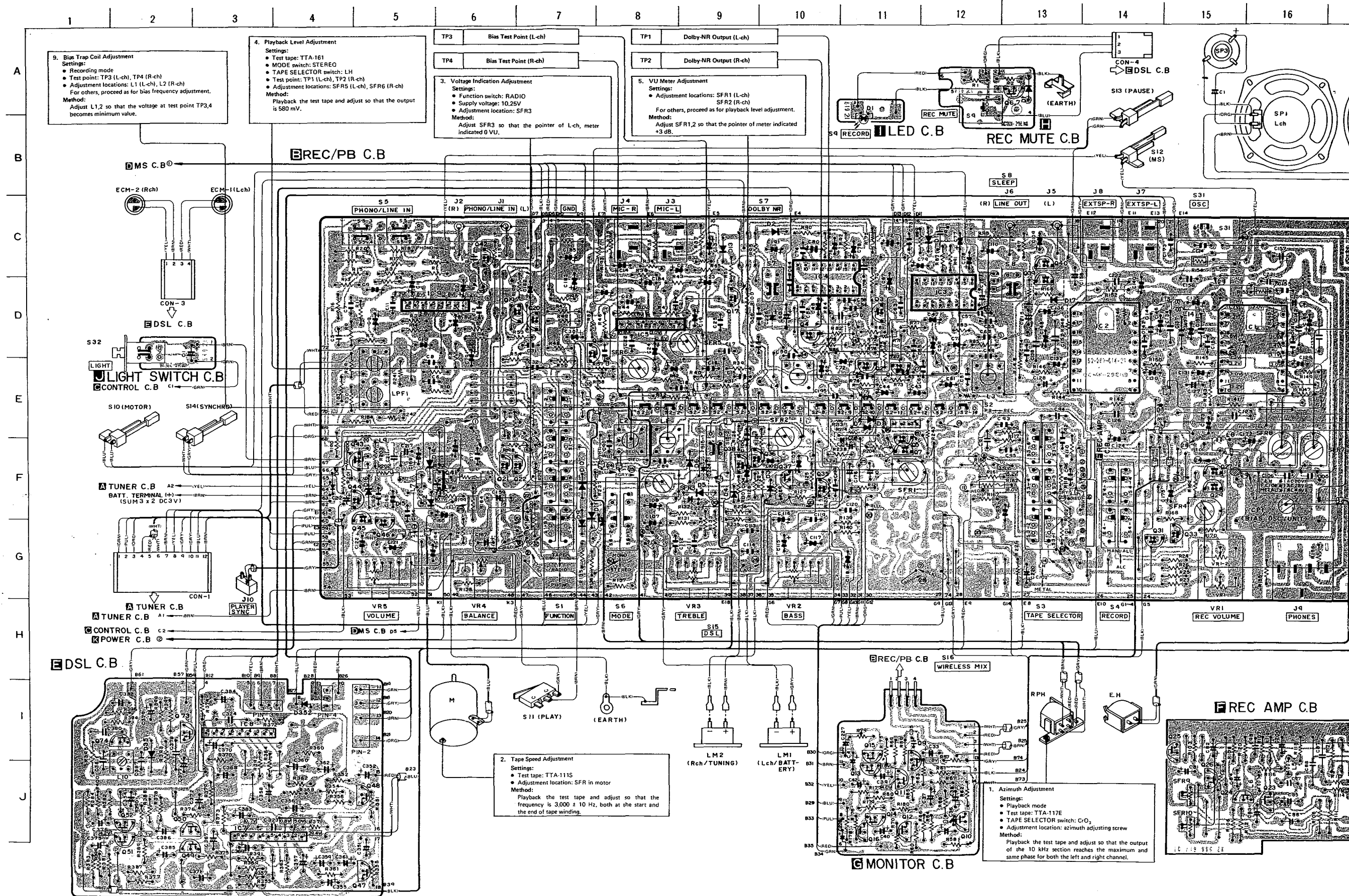
## SCHEMATIC DIAGRAM-2





- (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
An asterisk (\*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

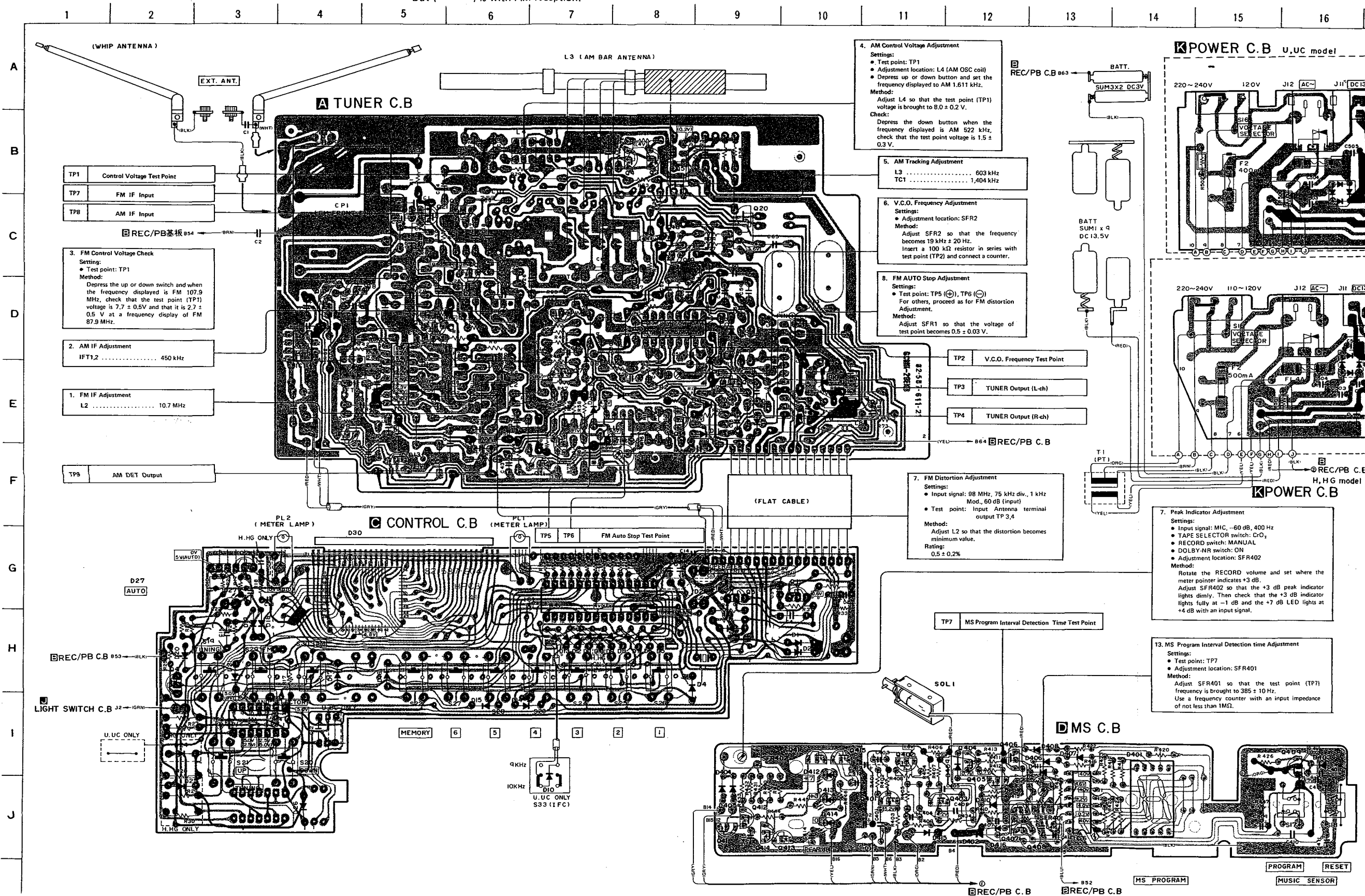
## WIRING-1



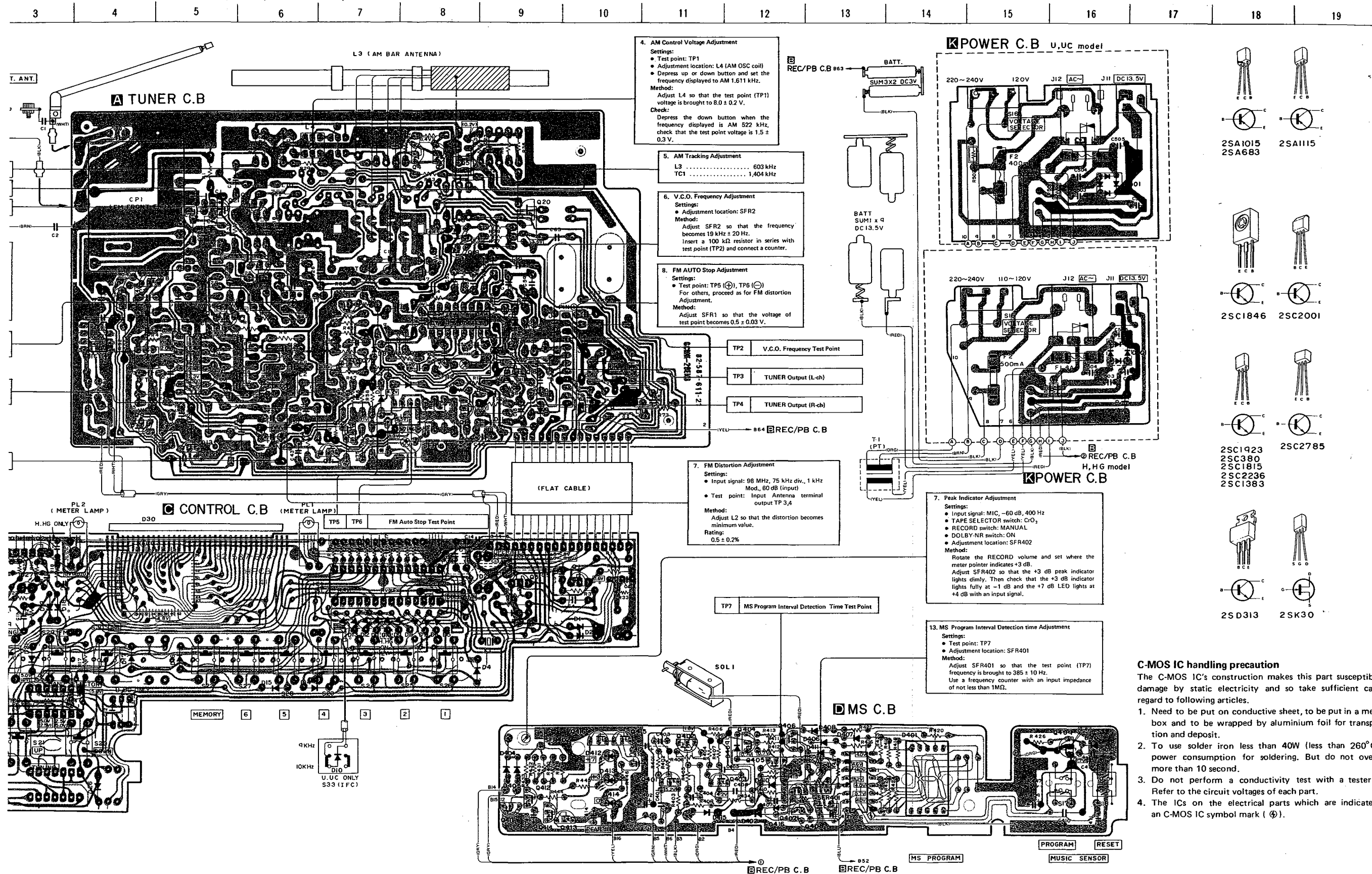




## WIRING-2

NOTES (1)  B(+) Pattern  Component side pattern  Others pattern(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
But ( ) is with AM reception.

- NOTES (1) B(+) Pattern Component side pattern Others pattern  
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
 But ( ) is with AM reception.



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4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (Ⓢ).